

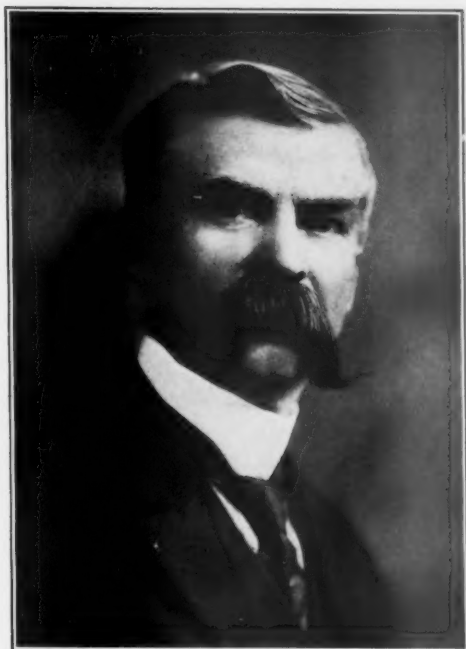
THE MINING CONGRESS JOURNAL

VOL. I

SAFETY-EFFICIENCY-CONSERVATION

DECEMBER, 1915.

No. 12



SENATOR THOMAS J. WALSH

Whose most recent address on mining topics appears in this issue

PUBLISHED BY
THE AMERICAN MINING CONGRESS
PUBLICATION OFFICE
MUNSEY BUILDING WASHINGTON, D. C.

\$ 2.00 PER YEAR

20 ¢ PER COPY

WILMOT ENGINEERING CO.

Works, White Haven, Penna.

HAZLETON, PENNA.

MANUFACTURERS OF

HIGH GRADE MACHINERY FOR THE PREPARATION AND HANDLING OF ANTHRACITE COAL

WILMOT RIVETLESS CHAINS for Conveyors
for Elevators
for Car Hauls

LLOYD COMPOUND (HOLLOW
GROUND
TOOTH) ROLLS

PARRISH Flexible Arm SHAKERS

SIMPLEX JIGS

handling
crushing
screening
cleaning

BEST SERVICE—LONGEST LIFE—LOWEST COST OF UP-KEEP

Let us figure with you on your new installation or replacing your old and obsolete ones

THE CANTON
AUTOMATIC MINE DOOR



IMPROVED METHODS

Without Additional Expense

IF you contend for old time methods, you might try keeping time by employing a boy with a hammer and gong, to strike off the hours as indicated by a sun dial. ¶ A trial, however, will convince you that a good clock is cheaper and more reliable. ¶ So is the Canton Automatic Mine Door better than a trapper boy. ¶ Write for literature.

THE AMERICAN MINE DOOR COMPANY, Canton, Ohio

THE MINING CONGRESS JOURNAL

DECEMBER	CONTENTS	1915
To Revise Mining Laws.....	643	Diamond Bearing Rock..... 667
Fire Burns Thirteen Years.....	646	Geologists to Meet..... 667
Molybdenum Experiment.....	646	Coal Most Valuable Mineral..... 668
Possible Source of Potash.....	647	Honored at Pittsburgh..... 668
May Not Accept Private Work.....	648	Editorials..... 669
Work on Piedmont Region.....	648	Take Iron Pyrite for Gold..... 674
Test Not Infallible.....	648	Map Work Handicapped..... 674
Pan-American Scientific Conference.....	649	Handling Long Mailing Lists..... 674
Withdrawals of Public Lands.....	652	Supreme Court Decisions..... 675
Survey Examinations.....	652	Cobalt Prices Drop..... 678
Coal and Peat Described.....	652	Senator Walsh Speaks..... 679
Coal Strike Threatens.....	653	Potash Explorations..... 680
Interest in Molybdenum.....	654	Burro Mountain Development..... 680
Potash from Brines.....	654	Traffic..... 681
Paper in Maps.....	654	Banquet to Director Manning..... 683
Copper Prospects.....	655	Montana Power Company..... 685
Location of Tungsten Mines.....	656	Legal Decisions..... 686
Demand for Antimony.....	656	Tungsten Uses..... 687
Mexican Asphalt.....	657	Indiana First-Aid Meet..... 687
Prepares Guide Book.....	657	Ransome on Arizona Quicksilver..... 688
Marketing Ores in U. S.....	658	Missouri Alumni..... 688
Ore Conservation Study.....	659	Coal for South America..... 689
Jeffrey Opens New Office.....	659	Commonwealth Finds New Ore Body..... 689
Reduction of Antimony Oxide.....	660	Couder d'Alene Study Postponed..... 689
Industry Being Stabilized.....	660	John Day Valley..... 690
Eastern Gold Mines.....	660	North Carolina Coal..... 690
Selby Commission Report.....	661	Fertilizer Publications..... 690
Spelter Corner Rumor Unbelieved.....	662	Platinum Output Increase..... 691
St. Francis Mountains Oldest.....	663	Advance Maps..... 692
Old Camp Being Reopened.....	663	Gold in Pennsylvania..... 692
Patents.....	664	October Mine Accidents..... 693
Tennessee Oil Field.....	666	Influences Canadian Geologists..... 693
A Manufacturing Industry.....	666	Personals..... 694

The American Mining Congress

The American Mining Congress is a voluntary association supported by the dues and fees of its members. It is striving to bring about:

First—Safety and efficiency in mining operations.

Second—Intelligent conservation with a view to the highest development and use of our mineral resources.

Third—The stimulation of investment in practical mining operations by showing that mining is a legitimate business when intelligently conducted.

Fourth—Uniformity in state laws governing mining operations carried on under like conditions.

Fifth—Such federal co-operation through research and investigation as will furnish the basis for intelligent state legislation, and will solve those problems of economical production, treatment and transportation which are essential to an increase in mineral production.

Sixth—The improvement of the economic conditions underlying the coal mining industry.

If you are interested in this work, now is the time to help; do not wait until those who are now carrying the burden have become discouraged.

The appended application blank will show the way. Come in and bring the neighbor who should join this movement. Mail application to

THE AMERICAN MINING CONGRESS

Munsey Building, Washington, D. C.

THE AMERICAN MINING CONGRESS

APPLICATION FOR MEMBERSHIP

.....191.....

I hereby make application for membership in THE AMERICAN MINING CONGRESS and agree, if accepted, to abide by the By-Laws, Rules and Regulations of said organization and to pay the dues required by same.

Name.....

Occupation.....

P. O. Address.....

.....

Recommended by.....

MEMBERSHIP FEE, \$15.00 ANNUAL DUES, \$10.00

To the Members of the American Mining Congress:

Do you know that you are the owners and publishers of the MINING CONGRESS JOURNAL? We trust you will realize the responsibility of this ownership and that you will lend your active assistance in making the Journal a greater success.

Real mining men should be active members. An application blank will be found on another page of this issue.

Associate memberships are designed for those not actively interested in mining, but who are willing to assist a state Chapter of the Mining Congress in helping to develop the Mining industry within the State. All memberships include subscription to the MINING CONGRESS JOURNAL.

Every member of the Mining Congress should undertake to send in at least one application each month. Will you help by having the following blank filled in and mail to this office?

SUBSCRIPTION AND APPLICATION FOR ASSOCIATE MEMBERSHIP
IN THE
AMERICAN MINING CONGRESS

.....191.....

I hereby make application for Associate Membership in THE AMERICAN MINING CONGRESS, and agree, if accepted, to abide by the By-Laws, Rules and Regulations of said organization and to pay the dues required by same. Herewith find \$1.00 fee and \$2.00 dues for one year, including subscription to the Mining Congress Journal (\$1.00 of which is designated as subscription to Journal).

Name.....

Occupation

P. O. Address.....

.....

Recommended by.....

PHELPS, DODGE & CO.

Selling Agents of the
Copper Queen Consolidated Mining Co.
Calumet & Arizona Mining Co.
Detroit Copper Mining Co., of Arizona
Moctezuma Copper Co.

*Electrolytic Copper, Wire Bars, Plates, Ingots
and Cathodes and P. D. Co. Casting Copper*

Cor. Cliff and John Streets
NEW YORK

EDMUND B. KIRBY

Mining Engineer and Metallurgist
918 Security Bldg., St. Louis

Specialty: The expert examination of mines and
metallurgical enterprises.

ELI T. CONNER

Mining Engineer "Coal"

Specialty: Managerial Consultation on Coal Mining
Stephen Girard Building
PHILADELPHIA, PA.

JOHN D. FIELDS

Mining Engineer

Designing and Constructing Copper Leaching
Plants a Specialty

MAXVILLE

MONTANA

SEELEY W. MUDD, Mining Engineer

1208 Hollingsworth Building Los Angeles, Cal.
Code: Bedford McNeill

Irvington Smelting and Refining Works

*Buyers, Smelters and Refiners of
Gold, Silver, Lead, Copper and Platinum
Ores, Sweeps and Bullion*

Manufacturers of Copper Sulphate

IRVINGTON :: :: NEW JERSEY

N. Y. OFFICE—Charles Engelhard
Hudson Terminal Building 30 Church Street

THEO. F. VAN WAGENEN

Mining Engineer

and

Geologist

1006 First National Bank Building
DENVER, COLORADO

Herbert Goodall Archie J. Goodall
GOODALL BROS., Assayers and Metallurgists
Smelter Shipments Checked Controls a Specialty
38 South Main Street, HELENA, MONTANA

TOUT & McCARTHY, Butte, Mont.
Assayers and Chemists

Assays, Analysis and Tests, Independent Control Work

HARRIS-STEVENSON COMPANY

Engineers, Designers, Manufacturers, Modern Mine Cars
First National Bank Bldg., PITTSBURG, PA.

H. N. LAWRIE

Consulting Mining Geologist

526 Yeon Building

PORTLAND

OREGON

L. D. Bell Phone,
1201 Grant

Cable "Rolyat."
W. U. Code

SAM'L A. TAYLOR, C. E.

M. Am. Soc. C. E. M. Am. Inst. M. E.
Consulting, Civil and Mining Engineer
506-509 Second National Bank Bldg.
PITTSBURGH, PA.

RUHL & SHANKLIN

Mining Engineers

JOPLIN

MISSOURI

WM. GRIFFITH

Mining Engineer, Geologist

COAL EXCHANGE, SCRANTON, PA.

Specialty—COAL. Careful Reports, Estimates, etc.
Interviews by appointment, New York or Philadelphia

GOODRICH

Mechanical Rubber Goods FOR MINES

Every year for the last forty-six years Goodrich has added to the wealth of knowledge and experience necessary to make

"Everything That's Best In Rubber"

CONVEYOR BELTS

ELEVATOR BELTS

TRANSMISSION BELTS

HOSE—ALL KINDS

PACKING

PUMP VALVES

These are but six out of 15,000 Goodrich products that have made good under all conditions of service. They will do the same for you.

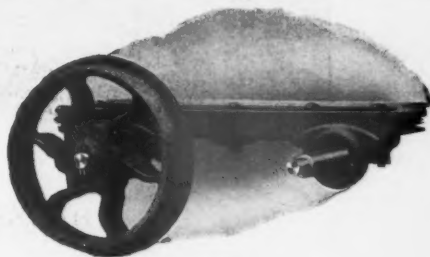
The B. F. Goodrich Company



Factories: AKRON, OHIO
Branches in All Principal Cities



Phillips Patent Open Cap Wheel Truck



THE economies that this Truck will effect are real and tangible. The wheels will not wear out internally and are guaranteed in this respect; they seldom break, due to our process of annealing and the high quality of materials used; are thoroughly chilled, and when lubricated with fluid grease will run for six months to a year with one lubrication. This Truck is used at hundreds of Mines, two concerns each using over 10,000, while literally dozens of other companies have found it profitable to discard their old running gear in order to equip their cars with it exclusively. It will pay you to investigate this Truck.

Write for full particulars

Phillips Mine and Mill Supply Company

Manufacturers of

Mine Cars and Trucks — Gravity Screening Equipments — Larry Wagons

Phillips Automatic Cross-Over and Automatic Push-Back Car Dumps

South Twenty-Third Street :: Office and Works :: PITTSBURGH, PENNA.

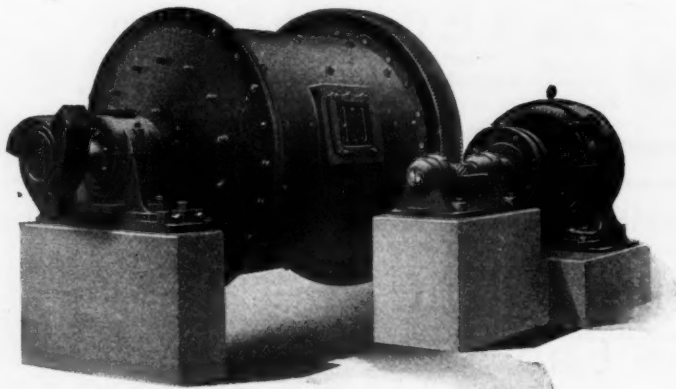
This Mill Can't Pump Itself Dry

WHY?

Because it is fitted with the

"G-H" Variable Discharge Diaphragm

which operates independently of the feed



THEREFORE

No excessive power consumption

No excessive ball consumption

No excessive lining consumption

No breakage of balls or pebbles

Allis-Chalmers Manufacturing Company
MILWAUKEE, WIS.

Offices in all principal cities

THE MINING CONGRESS JOURNAL

Official Organ of the American Mining Congress

REVISION OF MINING LAWS TO BE URGED AT MEETING IN WASHINGTON

**Mining and Metallurgical Society of America Calls Together Representative Mining
Men From all Parts of Country—Hopes to Impress Congress
with Need of Prompt Legislation**

A large number of prominent mining men are expected to gather in Washington, December 16 to urge upon Congress the necessity for a revision of mining laws. The meeting was called by the Mining and Metallurgical Society of America. The following rules for the conduct of the convention have been adopted:

The meeting to comprise three sessions, the first beginning at 10 a. m., the second at 2 p. m., and the third at 8:30 p. m.

The meeting to be organized with the president of the Mining and Metallurgical Society in the chair. The presiding officers in the several sessions to be the presidents of the Mining and Metallurgical Society of America, the American Institute of Mining Engineers, and the American Mining Congress, or representatives of those organizations.

A committee on credentials, three members, to be named by the Mining and Metallurgical Society of America.

The several sessions to be open to all persons interested in the mining industry, but the right of voting to be limited to accredited delegates and other persons especially invited.

Credentials to be: (1) Membership in the societies invited; (2) Representatives, one each, of chambers of commerce especially invited. Representatives, one each, of operating mines in the United States, provided that any such mines have no representation through membership in a society, or otherwise. Representation in all cases to be limited to citizens of the United States. Credentials to be passed upon by the committee on credentials, whose decision will be final.

A committee on rules, three members, to be appointed by the chairman.

A committee on resolutions, five members, to be appointed by the chairman.

All resolutions to be submitted to the committee on resolutions.

The committee on rules to have the right to make provisions limiting and concluding debates, if necessary.

Persons attending the meeting are requested to register in the record book that will be provided for the purpose. Official headquarters will be in the Raleigh Hotel; registration in the United States Bureau of Mines; meetings in the auditorium of the United States National Museum.

MINING CONGRESS ACTIVITIES

While the American Mining Congress has had more important work to do in the interest of the mining industry than urging the revision of mining laws, it has given this matter considerable attention. Its committee on the revision of mining law consists of the following:

E. B. Kirby, St. Louis, Mo., chairman; L. V. Ray, Seward, Alaska; Will L. Clarke, Jerome, Ariz.; E. H. Benjamin, San Francisco, Cal.; Victor C. Alderson, Denver, Col.; J. H. Richards, Boise, Idaho; Wm. Scallon, Helena, Mont.; Horace V. Winchell, Minneapolis, Minn.; D. C. McDonald, Ely, Nev.; C. T. Brown, Socorro, N. Mex.; H. H. Schwartz, Portland, Ore.; Isador Broman, Austin, Tex.; W. H. King, Salt Lake, Utah; L. K. Armstrong, Spokane, Wash.; Edwin Hall, Lusk, Wyo.

This committee submitted the following report to the Mining Congress September 22 of this year:

"The American Mining Congress inaugurated and has for some years been leading, the

movement for a general revision of the Mineral Land Laws of the United States.

"The present laws framed in 1872 are 40 years behind the times. They have never conformed to the facts of geological structure and are not adapted to present methods of prospecting, developing or financing mining properties. The widespread dissatisfaction of the mining public with them has long been expressed through every means at its command. Judges, lawyers, engineers, geologists and mining men of every class have been pointing out the various faults and evils of the present code. Distinguished men, technical journals, mining and engineering societies have again and again voiced their criticisms and discussed methods of reform, but all without effect upon an indifferent government at Washington.

"There was no relief in sight until the American Mining Congress undertook to concentrate all effort towards reform upon the creation of a commission which should visit the mining communities and secure the results of their experienced judgments as a basis for intelligent revision by Congress.

"The movement toward this has steadily grown until the administration and Congress were obliged to recognize it and last year a bill for a revision commission was approved by the Secretary of the Interior and passed by the Senate. A similar bill in the House was favorably reported by its committee on mines and mining but was hung up by the pressure of other business and Congress adjourned without taking action. Since then the war and its complications have absorbed the attention of Congress, of the administration and of the general public. Under these conditions, it was understood that any effort to push mining law revision at the last Congress would be labor wasted and that this reform, like other measures for international improvement, would have to be held in suspense during the present storm.

"Meanwhile, the forces back of the revision movement have steadily grown in strength. The two great organizations of the mining professions, the American Institute of Mining Engineers and the Mining and Metallurgical Society of America, are supporting the movement to the limit of their ability, but the American Institute of Mining Engineers has been restricted by provisions in its constitution which prevented it from taking up public questions. The desire to secure revision, however, was so overwhelming as to raise the whole question of freedom of action for the institute with the result that the restrictions were removed at the time of its last annual meeting in February and it is now free to devote its energies to the cause.

"It is the intention of your committee not to press matters while the present tension exists at Washington, but to move vigorously in cooperation with the other societies mentioned as soon as the friends of revision in Congress advise that action is practicable. It is now probable that this time will arrive during the coming session. Having so nearly at-

tained success last year, it is intended to press forward at the first opportunity.

"The following draft of bill adopted by the American Mining Congress for recommendation to Congress is one which, after several years of experience, was designed to harmonize the many conflicting views and to minimize criticism and opposition so far as possible. It seems to have accomplished this so far as any suggestion to Congress can do so and has been the basis for the actual bills framed by the Senate and the House Committees."

DRAFT OF BILL

A preliminary draft was suggested for a joint resolution of the Senate and House as follows:

"That Congress shall undertake a general revision of the laws relating to mineral bearing lands and mineral rights within the United States and Alaska and such revision shall cover mineral deposits of every kind except those of coal, phosphates and salines, which have been set aside as the subjects of other and special legislation.

"In view of the technical nature of the problems presented by the work it is desired to secure first the results of the knowledge and experience which exists among those who are engaged in the mining industry.

"To this end the President shall, within sixty days hereafter, appoint a commission of five members who shall be selected for their recognized knowledge and experience in the mining industry.

"The commission shall consider the mining laws of this and other countries and shall hold public hearings in the principal mining centers of the Western States and Alaska, giving full opportunity for the expression of public opinion concerning the problems before it. Its recommendations shall be presented in the form of a fully drafted mining code.

"Within six months after the appointment of the commission its report shall be delivered to the President who shall within 30 days thereafter transmit it to Congress with his further recommendations if there be any.

"Members of the commission shall receive per diem with expenses and shall engage such clerical assistance as may be necessary for the work."

This clause providing for the necessary funds also was inserted in the committee's report:

"Your committee desires again to impress upon the American Mining Congress that the recommendations of the Congress upon any matter, to be effective, must be properly presented at Washington and this requires steady, persistent work by some one who can stay there. Its secretary must, therefore, be given the means with which to carry on his work there in the proper way. This is absolutely necessary to supplement the efforts of your various committees who can only act through correspondence and the occasional visits of their members."

REVISION OF MINING LAWS

Resolutions adopted by the Utah Chapter of the American Congress are:

WHEREAS, Experience has demonstrated conclusively that the present mining laws of the United States, as written, interpreted and construed, cause conflicts, disputes, litigation and loss; do not afford sufficient and proper encouragement and protection to those who seek to develop the mineral resources of the Nation; make it needlessly difficult to obtain and hold titles to mineral lands and to obtain capital for their development; and are inimical to the best interests of the industry in other ways, and

WHEREAS, Previous efforts to obtain the legislative action necessary to correct inadequacies and evils of the present laws have failed of result chiefly because the representatives of the mining industry have not presented its legislative needs with sufficient unanimity, particularity and vigor to the Congress of the United States and the executive and administrative officers of the National Government, and

WHEREAS, The subject has been thoroughly and intelligently investigated and studied by a capable committee of the Mining and Metallurgical Society of America, which has adopted the following program recommended by said committee:

1. The mining law should be revised not piece-meal, but thoroughly so as to coordinate and harmonize its various provisions.

2. A statute of limitations should establish a reasonable term of years beyond which placer patents shall be immune from attack on the ground of fraud.

3. Full privilege of appeal to some competent court of law should be provided for in all cases of contests between rival claimants, or between a locator and the Government.

4. Notice of mining locations should be so recorded as to give the fullest possible public notice.

5. The law of the apex should be abolished.

6. Existing titles should be reaffirmed and fully recognized and no effort should be made to create retroactive legislation.

7. For the purpose of giving the fullest consideration to the needs of very branch of the mining industry and every section of the country, it is desirable that a Government commission be created by act of Congress, whose duty it shall be to investigate by every proper means the questions and interests here referred to, and to make recommendations as a basis for the proposed mining law revision; and

WHEREAS, The said Mining and Metallurgical Society of America has called a general convention of representatives of the mining industry of the United States to meet at Washington, D. C., December 16, 1915, there to consider and act on the said program and to devise ways and means most effectively to present the desired legislative action to the Congress of the United States, and

WHEREAS, It appears vitally important that all mining interest join in support of the movement hereinbefore set out, therefore, be it

Resolved, By the Utah Chapter of the American Mining Congress:

1. That the movement to obtain revision of the United States mining laws be indorsed and the program proposed therefor by the Mining and Metallurgical Society of America be indorsed as to its general plan, subject to such changes as may hereafter be proposed or favored by this Chapter.

2. That the Executive Committee of this Chapter be directed and empowered to take such steps as may in its judgment seem necessary and proper to have the mining interests of Utah represented at this convention.

3. That the Senators and Representatives of Utah in the Congress of the United States, the Governor of Utah and the commercial and industrial bodies of the State be urged to give their fullest support to the efforts made to obtain revision of the mining laws of the United States.

Delegates to Mining Convention

The following delegates have been appointed to attend the mining convention to be held at Washington, D. C., December 16, 1915, under the auspices of the Mining and Metallurgical Society of America:

E. B. Kirby, 120 Broadway, New York City; Van H. Manning, U. S. Bureau of Mines, Washington, D. C.; Dr. George Otis Smith, U. S. Geological Survey, Washington, D. C.; Dr. A. H. Brooks, U. S. Geological Survey, Washington, D. C.; Hon. J. W. Thompson, U. S. Bureau of Mines, Washington, D. C.; R. A. F. Penrose, Jr., Bullett Building, Philadelphia, Pa.; Prof. Charles E. Munroe, George Washington University, Washington, D. C.; H. W. Hardinge, 50 Church Street, New York City; Sidney Jennings, 42 Broadway, New York City; S. A. Taylor, Second National Bank Building, Pittsburgh, Pa.; Carl Scholz, 139 West Van Buren Street, Chicago, Ill.; J. F. Callbreath, Munsey Building, Washington, D. C.; Clyde A. Heller, Bullitt Building, Philadelphia, Pa.; Thomas Dolan, U. G. I. Building, Philadelphia, Pa.; N. H. Wheeler, Penn Building, Philadelphia, Pa.; Will A. Clark, Jerome, Ariz.; Walter Douglas, New York City, and H. S. Munroe, New York City.

Thanks Director Manning

A formal resolution has been passed by the Mining and Metallurgical Society thanking Director Manning, of the Bureau of Mines, for the assistance he has given in aiding them in arousing interest in the revision of laws meeting to be held in Washington this month.

FIRE HAS BURNED IN ARIZONA MINE FOR MORE THAN 13 YEARS

There is a portion of the United Verde mine at Jerome, Ariz., that has been on fire for the past thirteen years and has defied all efforts to put it out. That portion of the mine is bulkheaded off and the rest of the property is working along as though no fire existed. The fire is visible from the surface through the smoke escaping through seams and openings, according to Charles F. Willis, of the Arizona Bureau of Mines.

What is actually happening is that the sulphur is burning off from the copper ore and the chemical reaction that takes place produces heat to such an extent that all efforts to put it out have been failures. The copper that is left in this portion of the mine is actually enriched by the loss of the sulphur.

A few years ago it was desired to get some of this high grade copper ore and a system of mining the burning ore was devised and is being successfully carried out. By means of bulkheads, firedoors, curtains, etc., the fire zone is segregated and air is pumped in under pressure. This not only serves to ventilate the drifts but blows or drives the fumes of the sulphurous gases back into the ground and the air in next to the fire is not at all uncomfortable. True it is hot and the rock that is being worked is so hot many times that it cannot be handled by the bare hands, but the men work in these places very satisfactorily and the ore is being extracted with a profit.

The United Verde is a property with one ore body, bought in the eighties for \$30,000, and it is rumored that \$100,000,000 was recently refused for the property. The ore body is massive, about 700 feet long by 2,000 feet wide and the depth yet to be determined. They possess a model town of Clarkdale and a model smelter. The property has paid in dividends over \$37,000,000, the greater part going to one man, the principal stockholder, Ex-Senator W. A. Clark.

The fact that the mine has many years more to operate is evidenced by the recent expenditures of the company for the improvements at Clarkdale costing about \$6,000,000 and doubling the capacity of their former plant. Although all Arizona has a good reputation for its treatment of labor, this property has a particularly enviable one, and it is believed that this fact has been largely responsible for its success.

Reports on Peat Resources

The Geological Survey of Wisconsin just has issued a comprehensive volume dealing with the peat resources of the state. It is by Frederick W. Huels.

Minnesota is preparing a report on its peat resources.

PURE MOLYBDENUM CANNOT BE MELTED INTO A MASS

Experience with molybdenite deposits seems to show that they are invariably very spotted and irregular in their occurrence. Until the past year no molybdenite mine has been regularly worked in the United States largely because of this irregularity in occurrence. The United States Geological Survey has in its possession pieces of metallic molybdenum which have been swaged and worked into shape. Some of this material is now on exhibition at San Francisco in the Mining Building.

The General Electric Company has in its Research Laboratory one of the finest corps of scientific assistants in this or any other country. The chief of the laboratory, Dr. W. R. Whitney, is a man whose character and standing are such that whatever he says or whatever goes out from the laboratory under his approval can be accepted with the same confidence as that from any other scientific workers. When the statement is made that molybdenum cannot be melted into a mass it is, of course, meant that pure molybdenum should be the result. It is understood by the Survey that it is comparatively easy to make carbides of molybdenum, and that such carbides are formed when the material is melted down in an electric furnace, the carbon coming from the electrodes. The only other known way of melting molybdenum is by the thermit method in which aluminum is added to the molybdenum. The difficulty has always been to melt down the material and keep it pure. As the melted point of molybdenum is reported to be something over 2,500° C., the difficulty is at once apparent.

Molybdenum is not obtained directly from the sulphide as a powder under ordinary practice, where it is to be used as a malleable metal but is first changed to one of its salts, such as the ammonium molybdate, and from that to the metal very much as tungsten is reduced.

An interesting article on molybdenum by Winne and Dantszen, entitled, "Electric Laboratory Furnace with Resistor of Ductile Tungsten or Molybdenum," appears in *Metalurgical and Chemical Engineering*, volume 9, No. 10, October, 1911, pages 537 and 538.

POTASH ANNOUNCEMENT EXCITES WIDE INTEREST

Due to the recent publication of information from the office of the Secretary of the Interior in regard to the successful production of potash at Marysvale, Utah, a large number of letters are reaching the Geological Survey, asking for more details in connection with the production of potash in the United States.

POTASH CONTENT OF COPPER TAILINGS CALLED TO ATTENTION OF NATION'S CHEMISTS

Geological Survey Suggests That Certain Ores May Become Important Source of Much Needed Mineral—Locked Up in Silicates Difficult Problem Offered

Another line on which the potash problem may be attacked is suggested by the United States Geological Survey in a bulletin published the middle of last month on "Potash in Certain Copper and Gold Ores." Evidence already is reaching Washington that this suggestion was all that was necessary to set a large number of chemists to studying the question.

B. S. Butler, who is the Survey's specialist on copper comments as follows on the problem in the introduction of the report:

"The amount of copper ore that is treated by concentrating methods has rapidly increased during the last few years and now exceed 30,000,000 tons a year. Probably 25,000,000 tons of western copper ores are now annually treated by this process. Any commercial use that might be made of the tailings from such treatment would be of prime importance. In the past the Survey, in its study of these deposits, has collected a large amount of information concerning the composition of the ores, much of which has recently been published for the first time. An inspection of these analyses shows the fact well known to students of the deposits, that the ores are relatively rich in potassium."

"In the treatment of the ores for the recovery of the metals contained they are finely ground. If the recovery of potash from silicates should ever become a commercial possibility it would seem that the tailings from these ores are in a condition well suited to cheap treatment and would furnish a very large supply. They are, moreover, accessible to transportation facilities and in many places to moderately cheap supplies of electric power, water, etc., that have been provided for recovering the metal content of the ores. The recovery of potassium from silicates has received much attention in recent years, but no commercially successful method has yet been put into operation. The large and cheap supply of such material however, is certain to encourage further investigation. It seems reasonable to suppose that in the treatment of ores in which the potassium occurs in the mineral muscovite, the muscovite will tend to collect in the finer material or 'slimes' and these finer tailings may be considerably higher in potassium than the coarser material. If they are, it may be to the interest of the companies to impound separately the fine and coarse tailings."

It is well known to chemists that after strong ignition, or after having been melted, the alkalis and a part of the alumina con-

tained in mica are soluble in sulphuric or muriatic acid, even if a rather weak acid is used.

Analyses of copper ores and tailings showing the amount of potash contained have been compiled and are contained in the bulletin. The samples analyzed are from the following copper districts: Bingham district, Utah; San Francisco district, Utah; Santa Rita district, N. Mex.; Ray district, Ariz.; Miami district, Ariz.; Morenci district, Ariz.; Ely, Nev.; Butte district, Mont.

Samples of gold ore, showing considerable percentages of potash, were taken from the following camps: Cripple Creek district, Colo.; Goldfield district, Nev.; Tonopah district, Nev.

Another possible source of potash is muscovite. The bulletin contains a note on this mineral by George Steiger.

VARIOUS FIRMS IN MARKET FOR MOLYBDENITE ORES

The Primos Chemical Co. is mining molybdenite on a rather large scale near Empire, Colo., and two other firms are said to be mining on a smaller scale in the same State. The use of molybdenite in steel has been given up by some firms, while taken up again by others. As at present known, the principal consumers of molybdenite in the United States are the Primos Chemical Co., Primos, Pa.; York Metal & Alloys Co., York, Pa., and the Goldschmidt Thermit Co., 90 West Street, New York City. The firms named use molybdenite to make molybdenum metal or ferro-molybdenum. The General Electric Co. may also be in the market for molybdenum ore, as it uses a considerable quantity of molybdenum metal. Molybdenite is used in chemicals by the J. P. Adamson Chemical Co., Phillipsburg, N. J., and the Baker & Adamson Chemical Co., Pennsylvania, and Henry E. Wood & Co., 1734 Arapahoe Street, Denver, Colo., are always in the market for molybdenite ores.

Ely Report to be Issued Next Year

The report on the Ely, Nev., mining district is still in the hands of the editor of the U. S. Geological Survey and probably will not be ready for distribution until next summer.

GOVERNMENT GEOLOGISTS MAY NOT ACCEPT PRIVATE WORK

The organic act establishing the U. S. Geological Survey contains the following provision:

"And that the Director and members of the Geological Survey shall have no personal or private interests in the lands or mineral wealth of the region under survey, and shall execute no surveys or examinations for private parties or corporations; . . ."

In accordance with this action by Congress, geologists of the Survey are not permitted to make geological or mining examinations in the United States or Alaska for private persons or corporations. Before entering upon such private employment in this country, the geologist must first submit his resignation.

On the other hand, geologists are permitted, on application, to do such private work in foreign countries for short periods provided the work in their care is in such condition that it may be suspended for a time without sacrifice of the public interests, and provided leave of absence without pay is taken for the entire period of employment for such foreign investigations. If the period of such service is of any considerable length, the geologist will tender his resignation before accepting private service; on the other hand, if the foreign service is entered at the request of the Government of some foreign country, State, or educational institution, the geologist is given leave of absence without pay.

It is considered an advantage to a geologist to have an opportunity to study geology in foreign countries, and if the investigations are systematic or detailed, the professional services of the geologist are so increased in value, as a result of the experience, as to be of benefit to the Survey as well as to the man. In harmony with this view, the geologist may, even when he has been engaged in foreign work for private parties, be reinstated in this Survey provided his services are needed, funds are available for his compensation, and his return to the service is accomplished within one year from the date of his resignation.

The practice above outlined is successful in giving an opportunity for foreign service to geologists who wish to broaden their experience, and in the case of private employment, to increase, incidentally, their income, though it has happened in some cases that geologists, on returning, have found their places filled and no funds available for their re-employment in the Survey. The rule regarding private work in this country is essential to the maintenance of the esprit of the scientific staff and the protection of the organization from most of the evils consequent upon mixing private service and private obligations with public service.

MISS BASCOM COMPLETING WORK ON PIEDMONT REGION

Office work on eight additional quadrangles in the Piedmont Plateau region of Pennsylvania will be completed by the end of the year. Some time will elapse, however, before publication will be made of this information.

No great amount of mining is in progress in this region. Some graphite is being mined. The development of this industry is hampered, however, by the difficulty of separating the graphite from the mica which it carries. As a result many failures have occurred. Progress is being made in treatment processes and it is probable that a cheap method of separation may be developed which will make possible the development of the extensive deposits of graphite in this region.

There is some iron ore in this portion of Pennsylvania, but it is not of sufficient richness to permit of mining under present conditions. Some extraction of ore has taken place in the past, however.

In the Chester and West Chester quadrangles feldspar and kaolin are mined in considerable quantities. The amount of feldspar mined, however, is decreasing, owing to the exhausting of deposits and the inferior grade of the product as well as the high cost of quarrying.

Painstaking work has been done in this general area by Miss Florence Bascome, a geologist in the service of the U. S. Geological Survey.

CANARY BIRD NOT SAFE TEST FOR LOW OXYGEN ATMOSPHERE

The resistiveness of a canary bird to oxygen deficiency has been demonstrated during two explorations of a mine fire area by the Bureau of Mines, Pittsburgh station, apparatus crew. Duplicate air samples that were collected during the first exploration at a point 1,000 feet from the fresh air base showed on analysis only 6 and 7 per cent oxygen, respectively, yet the canary bird was apparently not affected. The safety lamps were extinguished, however, before the apparatus crew advanced to the point where these samples were collected.

On the second exploration to a point 2,000 feet from the fresh air base one air sample showed only 2 per cent oxygen, and the canary was of course overcome long before this point was reached. However, the bird was carried back at once to the point where the analysis had shown 7 per cent of oxygen, and when the apparatus party returned in twenty minutes, they were surprised to find that the canary had revived in that atmosphere. All analyses were made with an Orsat apparatus inside the mine at the fresh air base. The atmosphere contained practically no carbon monoxide.

LEADING LIGHTS IN THE SCIENCE OF MINING TO DISCUSS INDUSTRY'S PROBLEMS

Pan-American Scientific Conference, Which Will Meet in Washington this Month, Will Call Together Many Noted Men Representing Every Country in the Western Hemisphere

This month is to witness the most important gathering of American scientists that ever has taken place. The Pan-American Scientific Conference will meet in Washington December 27 and will be in session for two weeks. Every country in this hemisphere will send some of its most distinguished scientists to this meeting.

The conference will cover a variety of scientific subjects, of which the sciences related to mining will form an important part. Hennen Jennings, of Washington, former vice-president of the American Mining Congress, is in charge of the section covering mining, metallurgy, economic geology and applied chemistry.

While some very important mining papers cannot be announced at this time, as those who have been invited to deliver them have not as yet signified finally that they will accept the invitation, the following list of papers gives an idea of the importance of the conference:

Hennen Jennings, 2221 Massachusetts Ave., Washington, D. C., opening address for mining section.

Van H. Manning, Director, Bureau of Mines, Washington, D. C. The United States Bureau of Mines.

J. W. Thompson, Bureau of Mines, Washington, D. C. The Valuation of Mining Properties.

J. R. Finley, New York City. The Valuation of Mining Properties.

Pope Yeatman, 165 Broadway, New York City, N. Y. The Chile Exploration Company's Property in Chile.

James E. Little, Spanish-American Iron Ore Co., Felton, Cuba. The Iron Ore Industry of Cuba.

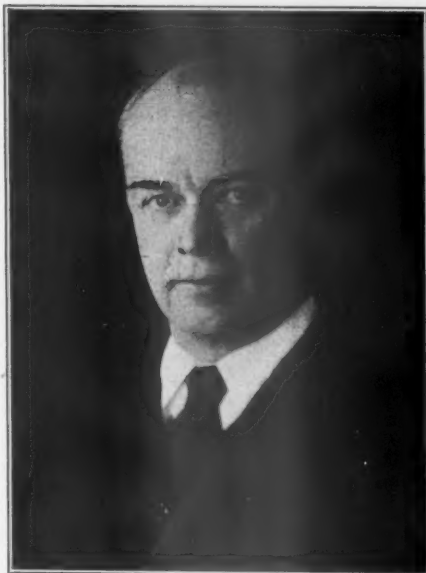
E. W. Parker, Williamsport, Pa. Uniformity in the Collection of Statistics of Mineral Production.

Howland Bancroft, Denver, Colo. Bolivian Tin Ores.

Walter Rittman, Bureau of Mines, 40th and Butler Streets, Pittsburgh, Pa. The Manufacture of Gasoline and Benzene-Toluene from Petroleum and other Hydrocarbons.

George S. Rice, Exp. Station, Bureau of Mines, Washington, D. C. Mining Cost and Selling Prices of Coal in the United States and Europe.

Carl Scholz, President, American Mining Congress, Munsey Building, Washington, D.



HENNEN JENNINGS

Chairman of Section VII of the Pan-American Scientific Conference.

C. The American Mining Congress and its Work.

Walter Harvey Weed, 29 Broadway, New York City, N. Y. The Copper Mining Industry in the Americas.

Charles Janin, 722 Kohl Bldg., San Francisco, Cal. Placer Mining Methods and Costs.

Enrique Cuevas, Chilean Embassy. The Nitrates of Chile.

Hennen Jennings, 2221 Massachusetts Ave., Washington, D. C., and Charles Janin, 722 Kohl Building, San Francisco, Cal. The Development of Gold Dredging in Montana. (Motion picture reels and photos.)

W. L. Saunders, 11 Broadway, New York City, N. Y. Costs of Drilling Rock and Breaking Ground, Geographically Considered.

J. W. Mercer, 15 Broad Street, New York, N. Y. Mining in Ecuador.

R. W. Raymond, 29 West 39th Street, New York City, N. Y. The Value of Technical Societies of the Mining Industry.

G. A. Roush, Asst. Prof. of Metallurgy, Lehigh University, South Bethlehem, Pa. Mineral Production of Latin America.

L. Vogelstein, 42 Broadway, New York City, N. Y. Buying and Selling of South American Non-Ferrous Metals.

Edwin S. Berry, 120 Broadway, New York City, N. Y. Mining at Braden (Chile).

A. H. Fay, Bureau of Mines, Washington, D. C. Mine Accidents and their Prevention.

METALLURGY

R. H. Richards, 491 Boylston Street, Boston, Mass. Ore Dressing.

C. L. Parsons, Chief, Division Mineral Technology, Bureau of Mines, Washington, D. C. The Occurrence and Preparation of Radium and Associated Metals.

R. W. Woolley, Director U. S. Mint, Washington, D. C. Assay Methods Used by the United States Mint.

Joseph W. Richards, Sec'y American Electrochemical Society, South Bethlehem, Pa. The Electric Smelting of Ores.

James E. Little, Mechanical Engineer, Felton, Cuba. The Iron Mines of Cuba and the Methods of Preparing their Ore.

W. R. Ingalls, 10th Ave. and 36th Street, New York City, N. Y. The Possibility of Zine Smelting on the Atlantic Seaboard of the United States.

G. H. Clevenger, 381 Hawthorne Ave., Palo Alto, Cal. The Possibility of Treating by the Cyanide Process the Complex Silver or Silver-Gold Ores of the Latin American Republics.

E. R. Mathewson, Anaconda, Mont. (Suggested by D. H. Brown, 43 Esch Place, New York, N. Y.) Use of Pulverized Fuel in Metallurgy.

ECONOMIC GEOLOGY

David White, Chief Geologist U. S. Geological Survey, Washington, D. C. Organization and Cost of Government Surveys.

E. C. Eckel, Munsey Building, Washington, D. C. Cement Production in the United States.

Waldemar Lindgren, Massachusetts Institute of Technology, Boston, Mass. Gold and Silver Deposits in North and South America.

David T. Day, 2511 Cliffbourne Place, Washington, D. C. Petroleum in Mexico.

I. C. White, State Geologist, Morgantown, W. Va. The Coals of Brazil.

E. W. Shaw, U. S. Geological Survey, Washington, D. C. Petroleum and Asphalts in the United States.

George Otis Smith, Director U. S. Geological Survey, Washington, D. C. The Public's Interest in Mineral Resources.

C. E. Siebenthal, U. S. Geological Survey, Washington, D. C. Lead and Zinc in the United States.

J. C. Branner, president, Leland-Stanford Junior University, Stanford University, Cal. Recent Contributions to the Geology of Brazil, and Their Relations to the Development of That Country.

C. K. Keith, University of Wisconsin, Madison, Wis. Iron Ore Deposits of the Americas.

M. R. Campbell, U. S. Geological Survey, Washington, D. C. The Coals of the United States.

CONSERVATION

Ralph Arnold, Union Oil Building, Los Angeles, Cal. Conservation of the Oil and Gas Resources of the Americas.

W. C. Mendenhall, U. S. Geological Survey, Washington, D. C. The Federal Government and the Nation's Mineral Resources.

Richard T. Ely, University of Wisconsin, Madison, Wis. Conservation and Economic Theory.

J. S. Burrows, Citizens' Bank Building, Norfolk, Va. Practical Difficulties in Conserving our Coal Supply.

Roswell H. Johnson, University of Pittsburgh, Pittsburgh, Pa. Prevention of Waste in the Oil Fields of the Eastern United States.

W. C. Phalen, U. S. Geological Survey, Washington, D. C. Conservation of Phosphate Rock.

T. N. Carver, Harvard University, Cambridge, Mass. The Conservation of Human Energy.

R. H. Hess, University of Wisconsin, Madison, Wis. The Stages in Economic Evolution and Conservation.

Floyd W. Parson, Editor *Coal Age*, Tenth Avenue and 36th Street, New York City. The Federal Government and the Nation's Mineral Resources.

J. W. Paul, U. S. Bureau of Mines, Pittsburgh, Pa. Mine Rescue Work.

Frank Haas, Fairmont Coal Co., Fairmont, W. Va. Saving of Coal Through the Employment of Better Methods of Mining.

J. F. Dunlop, U. S. Geological Survey, Washington, D. C. Conservation of Metals by the Recovery of Scrap or Used Metals.

W. H. Emmons, University of Minnesota, Minneapolis, Minn. Conservation of Copper.

J. F. Callbreath, Sec'y American Mining Congress, Munsey Building, Washington, D. C. Government Control of Minerals on Public Lands.

Dr. C. K. Keith, University of Wisconsin, Madison, Wis. Conservation of Iron Ores.

Section VII comprises the following subjects: Mining and metallurgy, economic geology, and applied chemistry. It will consider especially the mineral resources of the several republics, the methods by which these resources can be developed and used, and the manifold applications of chemistry in the production and utilization of materials of benefit to man.

The chairman of this section is Hennen Jennings, a former president of the London Institute of Mining and Metallurgy and member of the Institute of Civil Engineers (Lon-

don), the American Institute of Mining Engineers, the South African Association of Engineers, and other national and international societies of scientific and mining interests. Mr. S. Sanford, mining engineer and editor, the United States Bureau of Mines, Washington, D. C., is the secretary of this section.

The following persons constitute the committees of the four sub-sections in Section VII:

MINING

Van H. Manning, director, United States Bureau of Mines, Washington, D. C., chairman.

J. F. Callbreath, secretary, American Mining Congress, Washington, D. C.

C. H. Lindley, attorney, authority on mining law, San Francisco, Cal.

E. W. Parker, Division of Mineral Resources, Bureau of Mines, Washington, D. C.

H. C. Perkins, mining engineer, 1701 Connecticut Avenue, Washington, D. C.

G. S. Rice, chief mining engineer, United States Bureau of Mines, Pittsburgh, Pa.

W. L. Saunders, president, American Institute of Mining Engineers, New York, N. Y.

B. B. Thayer, mining engineer, 42 Broadway, New York, N. Y.

METALLURGY

W. R. Ingalls, president, Mining and Metallurgical Society of America, and editor of the *Engineering and Mining Journal*, New York, N. Y., chairman.

F. G. Cottrell, chief chemist, United States Bureau of Mines, San Francisco, Cal.

R. H. Richards, professor emeritus of mining and metallurgy, Massachusetts Institute of Technology, Boston, Mass.

Bradley Stoughton, secretary, American Institute of Mining Engineers, New York, N. Y.

L. D. Ricketts, mining and metallurgical engineer, New York, N. Y.

Karl Eilers, metallurgical engineer, New York, N. Y.

W. R. Walker, metallurgical engineer, New York, N. Y.

C. H. Clevenger, professor of metallurgy, Leland Stanford Junior University, Stanford University, California.

ECONOMIC GEOLOGY

George Otis Smith, director, United States Geological Survey, Washington, D. C., chairman.

J. C. Branner, president, Leland Stanford Junior University, Stanford University, California.

J. F. Kemp, professor of geology, Columbia University, New York, N. Y.

Waldemar Lindgren, professor of economic geology, Massachusetts Institute of Technology, Boston, Mass.

Charles R. Van Hise, president, University of Wisconsin, Madison, Wis.

David White, chief geologist, United States Geological Survey, Washington, D. C.

I. C. White, State geologist, Morgantown, W. Va.

Bailey White, consulting geologist to Argentine Government, professor of geology, Leland Stanford Junior University, Stanford University, California.

APPLIED CHEMISTRY.

Charles E. Munroe, authority on explosives; dean, graduate studies, George Washington University, Washington, D. C., chairman.

Carl L. Alsberg, chief, Bureau of Chemistry, Department of Agriculture, Washington, D. C.

C. H. Herty, president, American Chemical Society, Chapel Hill, N. C.

B. C. Hesse, consulting engineer, 90 William Street, New York, N. Y.

W. F. Hillebrand, chief chemist, United States Bureau of Standards, Washington, D. C.

Lawrence Addicks, president, American Electrochemical Society, Douglas, Ariz.

P. C. McIlhiney, chemist, chairman of New York section, Society of Chemical Industry, New York, N. Y.

Harvey W. Wiley, contributing editor, *Good Housekeeping Magazine*, Washington, D. C.

SPECIAL CONFERENCES

Topics for special Pan-American conferences in each of the four sub-sections of the mining section are:

The mining law of each country and the changes that may be made to aid the development of mineral resources. History of the mining industry in each country with reference to the beginnings of that industry. The development of the Patio process. Bibliography of mining.

Present methods of concentrating ores and the development of concentration methods. International relations in the exchange of ores and metals. Bibliography of metallurgy.

Development of hydroelectric power for mining and metallurgy, the amount probably available, and specific benefits from its utilization.

The relation of geological work to the development of the country. A bibliography of economic geology.

Natural and artificial nitrates; the present status and the outlook for these industries.

Manufacture of Ferros

The Geological Survey has published no literature covering the manufacture of various ferros. Ferro-titanium has been manufactured by one company by smelting in an electric furnace, rutile, coke, and iron beneath a bath of aluminum. The Goldschmidt Thermit Co., 90 West Street, New York City, has manufactured all of the ferros mentioned and others by mixing the various ores with iron and smelting with thermit. Ferro-taungsten, ferro-vanadium, and ferro-molybdenum are also made in the electric furnace.

WITHDRAWALS AND RESTORATIONS OF PUBLIC LANDS

Summary of principal withdrawals and restorations during the period March 4, 1913, to October 31, 1915 (in acres):

	<i>Outstanding withdrawn March 4, 1913</i>	<i>Withdrawn during period.</i>	<i>Restored during period.</i>	<i>Outstanding withdrawn Oct. 31, 1915</i>
Coal	65,410,464	436,726	17,402,697	48,444,493
Oil and gas	4,817,706	550,580	538,619	4,829,667
Phosphate.....	3,367,378	443,972	1,151,214	2,660,136
Potash	133,829	211,384	3,200	342,013
Power site	1,857,258	542,450	165,066	2,234,642
Public water	86,216	98,431	2,702	181,945
Totals	75,672,851	2,283,543	19,263,498	58,692,896

CONDITIONS UNDER WHICH SURVEY MAKES EXAMINATIONS

When studies of geologic structure, with reference to the possible occurrence of oil or gas, are made by the U. S. Geological Survey in cooperation with State surveys or other governmental organizations, including municipal governments, which contribute to the cost of the investigation, the areas to be examined are agreed upon in conference, or, in some cases, are accepted by the Survey on recommendation of the cooperating organization.

In view of the greater amount of work to be accomplished through the cooperative funds, added to the Survey appropriation, precedence in the formulation of plans covering geological field work is generally given to cooperative projects.

Examinations made at the request of other Federal bureaus also are given precedence in the distribution of the Survey funds available for oil and gas investigations.

Finally, the remaining funds that may be allotted to oil and gas structure studies are devoted to the examinations of regions where, after the consideration of the conditions in all parts of the country, it appears that the greatest public benefit is to be derived from the work, or where there is most widespread public interest in the possible occurrence of oil and gas in commercial quantities.

The Survey is prohibited by law from making examinations in the interests of private parties or corporations and does not lend the assistance of its geologists for such service.

Antimony Report to be Out Soon

The manuscript of the Geological Survey antimony report has been finished. This is the most complete report on this metal ever attempted by the Survey. In addition, the report discusses arsenic, bismuth, selenium and tellurium. It will be ready for distribution in about two months.

FORMATION OF COAL AND PEAT IS DESCRIBED CONCISELY

Charles A. Davis, fuel technologist at the Bureau of Mines, is the author of the following concise paragraph describing the manner in which peat, lignite, coal and graphite are formed:

"Peat is incipient coal. It is made up of the more or less thoroughly decomposed and carbonized remains of plants accumulated under conditions that have prevented their complete transformation into gaseous and mineral matter. In the course of their growth plants segregate carbon dioxide from the gases of the atmosphere and, by the aid of sunlight, decompose it and water in their green tissues and recombine the elements into complicated organic compounds, in which carbon is the characterizing element. If the compounds formed in this way by practically all green plants decay in the air, they are slowly changed back to gases again, chiefly by the activities of plants and animals of low orders, the biochemical agents of decomposition. If, however, the air is excluded from accumulations of plant material, chemical and physical changes of quite a different character take place—and much more slowly than when air is present—by which the vegetable matter loses only a part of its constituents. In the course of such changes and losses two gases—hydrogen and oxygen, the chemical elements that form water—disappear more quickly than carbon, the third important chemical element, which in combination with them forms cellulose and lignin, the compounds of which most plant tissues and organs are composed. The carbon is concentrated as such changes continue, and the original plant material becomes more and more nearly pure carbon. Peat, lignite, coal, anthracite and graphite, a form of carbon, are successive stages in this process of carbonization as it is represented in nature. Similar changes are made in wood or other plant structures when they are heated in closed vessels, the residue left after heating being charcoal, also a form of nearly pure carbon."

OFFICIALS HERE ALARMED OVER PROSPECTS OF BIG COAL STRIKE

President Already Is Considering Means of Averting Threatening Trouble, It Is Believed—Exceptional Opportunity Presented to Labor Unions with Country-wide Coal Famine More Than a Possibility

Washington hears that serious trouble is brewing in the coal fields. In April, for the first time in six years, the working agreement between both the anthracite and bituminous operators and the miners will expire simultaneously. It is the belief here that unless some method be found for settling disputes now assuming definite and threatening form, a coal strike will develop next April.

At the present time, it is pointed out, the labor unions are in excellent condition, both financially and numerically. Their general and local treasuries are full to overflowing, their ranks are filled up, and there is no danger of complications arising through the competition of non-union foreign labor. The drain on the labor supply occasioned by the war in Europe, and the closing of the source of this supply by the same cause, have made the percentage of union members in the coal fields unprecedentedly high.

Union labor is cognizant of its present advantage and labor leaders declare that the situation is so favorable that should there be a strike, the miners would enjoy a peculiarly advantageous position throughout. This might mean a continuance of the disagreement and strike through the spring, summer and autumn of 1916, and the coming of winter with a coal famine throughout the land.

The attitude of the United Mine Workers of America over a number of years makes it possible to forecast the demands of the miners and the methods adopted to force their acceptance. The tri-district convention of the United Mine Workers recently held in Wilkes-Barre, Pa., hinted that the demands of the anthracite workers would be recognition of the union, an eight-hour day, a 20 per cent increase in wages, and a "more speedy, simplified, and satisfactory method of settling disputes," this latter probably meaning a union tribunal empowered to make settlements. Of greatest significance, however, it is explained here, is the expected demand for a two-year, instead of a four-year agreement.

The Department of Labor has studied the question in detail and has made tentative recommendation to the President. This report may have had a bearing on the announcement made after a Cabinet meeting of last month, that mining legislation would be pressed by the administration. At any rate, whatever is to be done must be accomplished speedily, for the miners recognize their present opportunity and are disposed to press the advantage.

There is no thought of an attempt to settle coal field differences the way the anthracite strike of some years ago was settled by President Roosevelt—by an extra constitutional means. Even though President Wilson were disposed to try that plan it is quite evident that he could not execute it. Opponents of that kind of settlement are wiser now than they were when Col. Roosevelt suddenly thrust his solution upon them and compelled its acceptance before they had time to think.

The Wilson administration, however, probably will place its first reliance in the good offices of the Department of Labor, and will count upon the sympathetic understanding of labor conditions credited to the chiefs of this department to accomplish an amicable settlement. It is the belief of some men here, who oppose the attitude which labor assumes in the coal fields, that the spirit of European syndicalism is strong among members of United Mine Workers of America. These men allege that if the demand for a two-year, instead of a four-year agreement is granted, it will serve to strengthen the syndicalistic program of periodic strikes. The desired end of this element in the miners' union, it is explained, is to control eventually the mines and operate upon a cooperative basis. To do this, it is pointed out, the mine owners must be placed in a position where the operation of the mines is no longer profitable. A series of strikes pressing excessive demands, it is alleged, would be the method used to bring this condition about. This program, say the students of labor problems, is an integral part of the syndicalistic propaganda and, in fact, is the basis of its philosophy.

It is folly to assume that a strike of such proportions as now threatens would be unaccompanied by violence. This is one of the phases of the situation which now gives greatest concern to Federal authorities.

To Visit Colorado Mines

J. J. Rutledge, of the Bureau of Mines staff, has visited a number of Colorado and Wyoming mines with the idea of observing improved methods of mining and to make arrangements for a visit of Oklahoma coal operators and engineers who wish to make a trip through the Colorado and Wyoming fields.

WIDESPREAD INTEREST IN MOLYBDENUM SHOWN

Judging from the large number of letters reaching the United States Geological Survey there is very widespread interest among mining men in molybdenum. Here are some samples of the more important questions asked and the replies that are made:

What has been the average price of molybdenite in recent years?

No average price for molybdenite can be given. The production has been small and irregular and the demand has been similar, so that molybdenite has been bought by individual bargaining. In general prices ranged from 15 to 30 cents per pound for molybdenite carrying 92 per cent MoS_2 until the last year or so.

About what is its present price?

During the last year or so molybdenite has risen in price to \$1 or even \$1.50 per pound for material carrying 92 per cent MoS_2 . Such prices, however, cannot be depended upon.

Is the price of molybdenite likely to remain stable after the war is over?

No prediction can be made as to whether the price of molybdenite will be stable after the war. So far as is known to the Survey, no developments in the use of molybdenum have taken place which promise a large and continued use of a metal.

Has any new development in the arts tended to increase its value?

The Survey has made inquiry for new uses of molybdenite which tend to increase its price. It is probable that its use in electrical apparatus will steady the demand but whether it will be sufficient to increase the price or hold the price to its present level the Survey cannot state.

What is the amount of annual consumption in the United States?

The annual consumption of molybdenite in the United States is unknown to the Survey. Small quantities are imported from foreign countries in the form of molybdenite, possibly some wulfenite, some molybdenum metal, and some ferro-molybdenum. These quantities are all comparatively small and the Survey has not been able to get definite figures showing the quantities. The production in the United States itself has never amounted to more than a few tons per year.

From where do the principal supplies of molybdenite come?

The greatest quantities of molybdenite are mined in New South Wales, Queensland and Norway. During the past year the Primos Chemical Co. has undertaken the operation of a molybdenite mine near Empire, Colo., on a considerable scale, and it is understood that two or three properties in Colorado are being worked on a smaller scale.

Please give the name of some firm that is a user of this mineral in quantity?

The following firms are users and buyers of molybdenite:

J. T. Baker Chemical Co., Phillipsburg, New Jersey.

Baker & Adamson Chemical Co., Easton, Pennsylvania.

Goldschmidt Thermit Co., 90 West Street, New York City.

Primos Chemical Co., Primos, Pa.

S. Schaaf-Regelman, 21 State Street, New York City.

Wood, Henry E. & Co., 1734 Arapahoe Street, Denver, Colo.

York Metal & Alloys Co., York, Pa.

EVAPORATION OF POTASH FROM BRINES DISCUSSED

According to the results set forth in a paper by W. B. Hicks, of the Geological Survey, the potassium is concentrated best in brines containing carbonates and chlorides, and poorest in those containing sulphates and carbonates, though a small amount of sulphate does not seem to hinder the concentration materially. In brines that contain several acid radicles the concentration of potassium may increase to a maximum as evaporation proceeds and then decline. The evidence at hand indicates that a large percentage of the potassium in a solution is lost during evaporation before the maximum concentration of potassium is attained. The loss is small until the potassium reaches a concentration of about 4 per cent, but it is very rapid during further evaporation. Therefore in the commercial extraction of potash from brines, especially those of the alkalies, it would seem best first to concentrate the solution by evaporation until it contained about 4 per cent of potassium, and then to subject the resulting bittern to other processes of manufacture. The most advantageous point of concentration would, however, have to be determined for each particular brine.

MANY TESTS MADE TO FIND BEST PAPER FOR SURVEY MAPS

Some complaint has been made as to the quality of paper used in the maps published by the U. S. Geological Survey.

The objection is that these maps will not stand frequent folding. The paper will stand only a limited amount of wear when carried in the pocket. It is suggested that a stronger grade of bond paper be used for these maps.

The Survey has long recognized the desirability of having a more durable paper, but it is impossible to bring out the small lines on these maps on the stronger grades of paper, and it is absolutely necessary to use smooth paper in order to take the fine lines which are so essential to these maps.

Experiments have been made with a large number of papers and the grade now used in the maps has proved the best.

Many engineers and geologists who have to carry these maps in their pockets while on field work, paste the maps on cloth in order to prevent wearing at the folds.

COPPER EXPECTED TO STAY AT PRESENT PRICE LEVEL AFTER THE WAR

Experts Here See No Reason Why Red Metal Should Slump with Close of Hostilities—Germans Now Control Servian Mines—Brass Shells Use Most Copper

It is the opinion of experts here that copper prices will not fall much below the present level after the war. While the war has developed that it uses more copper than do the works of peace, it is believed that re-stocking will be carried forward during the next few years to sufficient extent to maintain practically the same demand for copper as exists at present.

No copper mining has been interfered with by the war. In fact the production of copper undoubtedly has been stimulated throughout the world. This has been the case especially in the mines of Germany and Austria. While these mines under normal conditions have not been large producers, it is believed that their production has been greatly increased since the time that Germany and Austria were cut off from foreign supplies. This does not mean that they will be able to continue operation when American copper can move unrestrictedly into Germany.

One of the developments of the recent campaign of the Teutonic powers into Servia is that they now control the copper producing territory of that kingdom. It is understood however that the Servians flooded the mines before abandoning them. There is little copper in Turkey and if the Germans should be successful in keeping open the road to Constantinople it would have no particular bearing on the copper situation, it is said here.

While the uses of copper in war are multitudinous, by far the greater part of the consumption goes into brass shells.

A considerable proportion of the German production of copper previous to the war, was used in the manufacture of articles for export. This trade has not stopped and the copper necessary for this manufacturing formerly done in Germany, now is being consumed by English and American manufacturers.

Topographers Return

A number of the topographical engineers who have been doing field work throughout the summer for the Geological Survey, have returned to Washington. Many of these men have been doing very important service in mining regions, both in the coal mining areas and in the metal mining districts. They will be in the office all winter to ink up the sheets on which they have been working.

COMING OF PEACE WILL STOP ANTIMONY AND TUNGSTEN MINING

It is practically certain that tungsten will fall to a point where it will be impossible to mine it with profit in this country, when the demand from Europe falls off, as is certain to happen with the close of the war. It is believed, however, that this slump in price will be temporary. As conditions stabilize there will be a market for American tungsten at prices that will admit of a reasonable profit, it is believed.

Following the war antimony will go to about the same price level as existed previously, it is believed. This means that it cannot be mined with profit in this country, unless larger and richer deposits are discovered than have been developed thus far.

Tin prices have not been affected greatly by the war. It is true that tin is now a few cents higher than it was previous to the opening of hostilities, but it is as likely that this is due to manipulation, as it is to any increased demand that has been occasioned by the new conditions brought about by the war.

While determined efforts have been made to find the source of the demand for molybdenum, results have been unsatisfactory. It has been established that Germany was a very large purchaser of molybdenum for more than a year previous to the outbreak of the war. It is known that some molybdenum is being used in tool steel and some in the determining of the amount of phosphorus in iron and steel. To just what extent the metal is being used in this country or abroad is not known. For this reason it is impossible for experts to forecast what effect the coming of peace will have on the price of this metal.

SCHOLZ AND DAY PUT ON LABOR EXCHANGE COMMITTEE

Carl Scholz, president of the American Mining Congress and of the Rock Island Coal Co., of Chicago, and Harry L. Day, first vice-president of the American Mining Congress and president of the Federal Mining Co., of Wallace, Idaho, have been named by the Chamber of Commerce of the United States as members of its committee on labor exchanges.

LOCATIONS OF TUNGSTEN**MINES IN U. S. ARE LISTED**

The principal tungsten fields of the United States are those of Boulder County, Colorado, and Atolia, California. The former produces the iron tungstate, ferberite, and the latter the calcium tungstate, scheelite.

In Arizona small quantities of tungsten ore are mined at the following places: Dragoon (the manganese tungstate, hübnerite); Arivaca (the iron manganese tungstate, wolframite); Cave Creek (ferberite), and smaller lots at other points. In Washington hübnerite is mined at Deer Park; wolframite at Cathedral Peak, near Loomis, and at Cedar Canyon. In Idaho small quantities of scheelite are mined at Murray, and hübnerite is mined at Patterson, Custer County. In Nevada, hübnerite and scheelite are mined at several places near Osceola, hübnerite at Round Mountain, and scheelite at Browns. In California, a little scheelite has been mined at Grass Valley, large quantities at Atolia, and a little at Randsburg, four miles from Atolia; wolframite with a little scheelite, has been mined in the New York Mountains in the eastern end of San Bernardino County. In Utah a little scheelite is found in the Deep Creek Mountains at the western side of the State. In South Dakota small quantities of wolframite are mined at Hill City and Lead. Although the Boulder County field in Colorado is a large producer of tungsten ores it is the only place in the State in which tungsten ores are found in commercially valuable quantity.

In 1914 the production of tungsten ores in the United States amounted to an equivalent of 990 tons of concentrates carrying 60 per cent tungsten trioxide (WO₃), and was valued at about \$435,000. Of this quantity 467 tons were produced from the Boulder County field, Colorado. A somewhat larger quantity was produced in the Atolia, California, field. This production, however, was below that of previous years and will be much exceeded in 1915.

The production for the past ten years, estimated in an equivalent of concentrates carrying 60 per cent of tungsten trioxide (WO₃), has been as follows:

	<i>Tons.</i>
1905.....	803
1906.....	928
1907.....	1,640
1908.....	671
1909.....	1,619
1910.....	1,821
1911.....	1,139
1912.....	1,330
1913.....	1,537
1914.....	990

Bulletin 583, of the United States Geological Survey upon "Ferberite of Colorado and Other Wolframites," and several extracts from Mineral Resources of the United States, deal with tungsten.

DEMAND FOR ANTIMONY**CONTINUES TO INCREASE**

The principal uses of antimony, the demand for which continues to increase, are in making bearing metals, white metals for the foundation of silver plated ware, and other plated ware, such as clock cases, table ware, coffin trimmings and toys. At present a great demand has been created by the use of antimony in making shrapnel bullets. The following persons are buyers of antimony ores:

Atkins, Kroll & Co., San Francisco, Cal.
Elsasser Merchants Finance Co., 625 Security Bldg., Los Angeles, Cal.

Frazer & Co., 50 Church Street, New York City.

C. W. Hill Chemical Co., 320 S. San Pedro Street, Los Angeles, Cal.

Edw. Hill's, Son & Co., Inc., 65 Wall Street, New York City.

Hoyt Metal Co., St. Louis, Mo.

M. D. Mackay, 130 Pearl Street, New York City.

Magnolia Metal Co., 113-15 Bank Street, New York City.

Pennsylvania Smelting Co., Pittsburgh, Pa.

Philipp Brothers, 42 Broadway, New York City.

Herbert Salinger, Beer-Sondheimer Co., Newhouse Bldg., Salt Lake City, Utah.

C. Solomon, Jr. (Chapman Smelting Co.), 409 Battery Street, San Francisco, Cal.

David Taylor, Consolidated Ores Co., Boston Bldg., Salt Lake City, Utah.

Wm. Wraith, Manager, International Smelting Co., Salt Lake City, Utah.

Two New Explosives Pass Tests

The Bureau of Mines has placed the explosive "du Pont Permissible No. 1" on its list of explosives permissible for use in coal mines. It belongs to Class 1a, ammonium nitrate, and is permissible only when used with detonators, preferably electric detonators, of not less efficiency than the No. 6. It is manufactured by the E. I. du Pont de Nemours Powder Co., Wilmington, Del.

The explosive "Red H No. 8" also has been placed on the list of explosives permissible for use in coal mines. It is manufactured by the Hercules Powder Co., Wilmington, Del.

The number of explosives now on the permissible list is 136.

Little Oil in Missouri

No reports have been published by the Geological Survey concerning oil in Missouri. Small amounts of oil have been discovered on the western border of the State. This occurrence of oil is chiefly in Bates, Jackson and Platte Counties. In no place has oil been discovered in commercial quantities.

MEXICAN ASPHALT CERTAIN TO DOMINATE IN EAST

The manufactured or oil asphalt produced in the United States is obtained from certain grades of crude petroleum found in California, Texas, Louisiana, Oklahoma, Kansas, and Illinois, as well as from the heavier grades of Mexican crude, which are imported in ever increasing quantities for the manufacture of asphalt and asphalt products, according to John D. Northrop, of the United States Geological Survey.

Since 1907 the output of manufactured asphalt from domestic sources has dominated the asphalt industry in the United States, though it had been recognized as a factor of growing importance for years before. In the year 1907 the output of manufactured asphalt exceeded for the first time the combined output of the natural varieties, and by a margin of 52,035 short tons. In 1908 and 1909 this margin was cut down to some extent.

Within the last two or three years oil asphalt from domestic sources has met a strong competitor for the American markets in a similar product manufactured in this country from heavy asphaltic oils imported from Mexico. Two new plants for the manufacture of asphalt from Mexican petroleum began operations in the United States in 1914, and the output was more than doubled as compared with 1913, reaching a total within 13 per cent of the output of oil asphalt from domestic sources. The higher asphalt content of the Mexican petroleum and the correspondingly lower cost of extraction has already converted certain refiners formerly utilizing petroleum of domestic origin to the exclusive use of the Mexican oil for asphalt manufacture.

That the Mexican product will dominate the market for oil asphalt in the eastern part of the United States in the future appears certain in consideration of the facts that the supply of crude material is abundant and that it can be delivered at Atlantic and Gulf ports at a less cost than suitable crude oils of domestic origin. The abundance of asphaltic oil in California, however, assures local dominance of the oil asphalt markets tributary to the Pacific coast for some time to come. The number of active plants producing oil asphalt in the United States in 1914 was forty-four, of which number thirty-six refined exclusively petroleum of domestic origin. In 1913 the active plants producing oil asphalt numbered thirty-six, of which number twenty-six refined American oil exclusively.

Thirty-one Idaho Maps

Thirty-one topographical maps of areas in Idaho have been published by the United States Geological Survey. No topographical map of the entire state has been published to date.



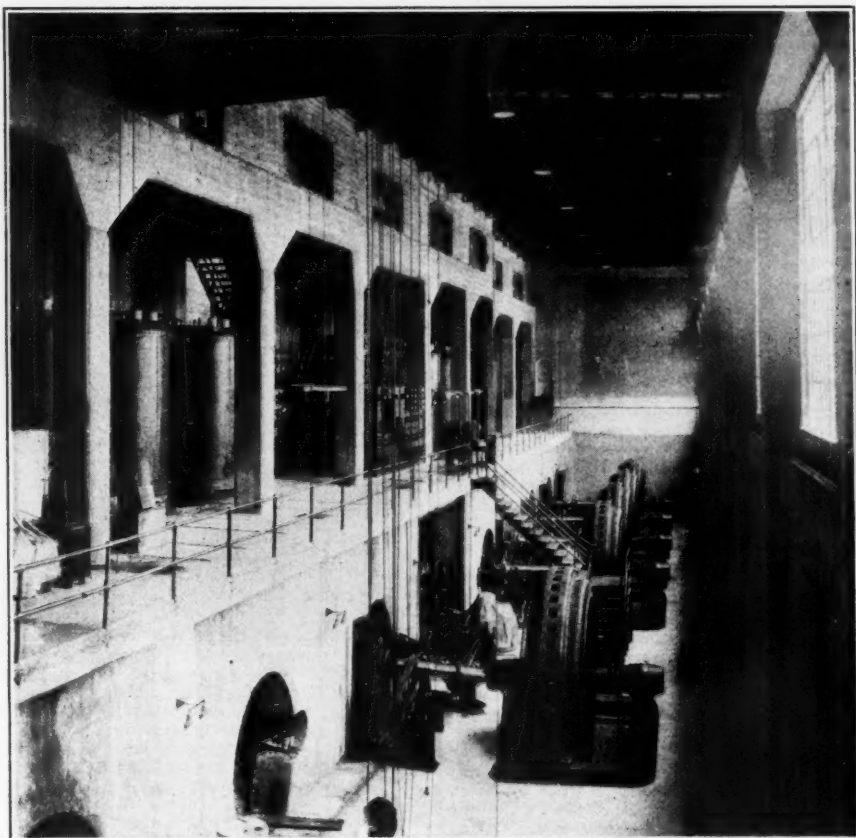
M. R. CAMPBELL
In charge of section of Western Fuels, U. S.
Geological Survey.

M. R. CAMPBELL WALKS ALONG 300 MILES OF D. & R. G. TRACK

After tramping over 300 miles of the ties of the Denver & Rio Grande Railroad, M. R. Campbell, of the U. S. Geological Survey, has returned to Washington with a large amount of valuable data which will be embodied in the Survey's Guide Book which will cover this railroad.

This line is regarded by many as the most scenic of all the western railroads. It is said to be traveled by more tourists than is any other line of railway in this hemisphere. During last summer the facilities of the road were entirely inadequate to handle the enormous amount of business thrust upon it. The war in Europe and the fair at San Francisco were two important causes of the heavy increase in tourist travel throughout the West.

The points of interest tributary to this road will be covered in detail from Denver to Salt Lake City. During the past summer Mr. Campbell was able to walk over the portion of the road between Denver and Grand Junction. The remaining portion of the road will be covered next summer.



TANEYCOMO PLANT OF THE EMPIRE DISTRICT ELECTRIC COMPANY
Which is one of the principal producers of power for use in the Joplin zinc district.

WORKING ON NEW ENGLAND GEOLOGICAL PROBLEMS

Geological problems of unusual interest have been under study in New England during the past summer. F. J. Katz, of the Geological Survey, has returned to Washington after several months spent in the vicinity of Portland, Maine, and Portsmouth, N. H. He has been doing detail geological work and mapping the geological formations. This work is of particular interest because many of the difficult problems of New England geology await the solution of the geological problem in the areas in which Mr. Katz has been working.

SOUTH AMERICA MARKETING ORES IN UNITED STATES

During recent months an unusual number of requests have been received from South American countries for publications of the Bureau of Mines and the Geological Survey.

The requests indicate that mining in most of the South American countries has been stimulated greatly since the opening of the war, and that the United States as a market for mineral products is proving very popular.

Agents of the Department of Commerce advise that every effort is being made by United States consuls, as well as by the special representatives of the Department of Commerce, to make much of this business permanent.

ENCOURAGING PROGRESS BEING MADE IN STUDY OF ORE CONSERVATION

Bureau of Mines Conducting Extensive Work in Utah and in Other States—Dorsey A. Lyons, in Charge of the Research, Consults Eastern Metallurgists on Problems Involved

While it is too early to announce any definite results in the work which has been in progress for more than a year in Utah, where extensive investigations are being conducted by the Bureau of Mines in the matter of conserving waste in various ores, the work is developing useful information in encouraging quantities, according to Dorsey A. Lyons, the metallurgist in charge of the Salt Lake station, and who is supervising similar work which is being done in several other States. Mr. Lyons was in Washington early last month consulting with Director Manning.

Particular attention is being paid to the conservation of lead and zinc values in Utah ores, which are now going to waste. This work is being done in cooperation with the State of Utah through the State University.

Low grade ore, which is too lean to treat, represents a considerable portion of the resources of Utah and other States. For example, in one mine in Utah there is more than 1,000,000 tons of such low grade ore blocked out.

WANT ALL MINERALS USED

The Bureau of Mines is trying to find some method by which it will be possible to make such a saving, as will permit of the mining of such ore. In addition experiments are in progress which will make possible the utilization of other minerals besides those for which the ore is mined.

This is illustrated by the following analysis of a complex ore:

Iron, 33 per cent; manganese, 12 per cent; silicon, 14 per cent; lime, 1.5 per cent; lead, 3 per cent; zinc, 5 per cent; copper, .2 per cent; silver, 3 oz.; gold, 30 cents.

This ore is treated for its lead content only, the iron, manganese, silicon, lime, zinc, copper, silver and gold are thrown away. To stop the waste of all these substances as well as that portion of the lead which is lost, is the reason for the research now being conducted at Salt Lake City and at other points, under the direction of the Bureau of Mines.

MAIN WORK AT SALT LAKE

As much of the work as possible is being concentrated at Salt Lake City, where milling machinery and ample laboratory facilities are available. Arrangements are being made for cooperation in this work with operators in Idaho. The work is now being conducted in Kansas and Missouri.

Before returning to Salt Lake City Mr. Lyons, who is in charge of the entire work, will see a number of metallurgists interested in this problem. He will visit a number of metallurgical plants, with the idea of familiarizing himself with the exact state of progress that they have reached in studying the problem. In this way it is hoped that all duplication of effort may be avoided.

GLAUCONITE CHIEF CAUSE OF LIMONITE FORMATION

In speaking of the origin of iron in northeastern Texas, E. F. Burchard says:

"With regard to the extent that glauconite has contributed to the formation of the northeast Texas limonite, I can say but little more at present than I have stated on page 74 of Bulletin 620-E, viz., that it is my belief that glauconite has played a more important part in the formation of the iron carbonite and limonite than has pyrite. I think that the abundance of glauconite must have been considerably greater than that of pyrite originally. At present, of course, glauconite is still much in evidence, while the pyrite, if ever present in appreciable quantities, has now practically disappeared. The products of decomposition of pyrite probably reacted upon the glauconite, and in such instances together they contributed iron; but it is significant that no ferruginous deposits are found except in association with more or less glauconite.

"The bedded limonite of Cherokee County was also of much interest to me. The overburden of an area of several acres had been stripped off so that I was able to get several good photographs showing the furrowed surface of the cap of sandstone at the top of the limonite."

Jeffrey Opens New Office

The Jeffrey Manufacturing Co., of Columbus, Ohio, announces that it has recently opened a new branch office in the M. & M. Building, Milwaukee, Wis.

This office is in charge of A. Q. Dufour, whose long experience and training in the application of Jeffrey products will enable him to be of great assistance in solving elevating, conveying and transmission problems.

REDUCTION OF ANTIMONY OXIDE TO ANTIMONY

The reduction of antimony oxide to antimony is accomplished by the following process according to Schnabel (Handbook of Metallurgy, translated by Henry Louis, vol. 2, The Macmillan Company, London and New York, 1907, pages 572 and 573).

"The object of this is to reduce the oxide (either tetroxide or trioxide) to metallic antimony or regulus of antimony. If coal alone be used for this purpose, a large proportion of the antimony will be lost through volatilization as trioxide, and any antimony sulphide still remaining in the roasted ore will not be decomposed. Substances are therefore added to the charges, which, on account of their easy fusibility, form a protecting cover and prevent the volatilization of the antimony; these also assist in the formation of fusible slags, and separate the metal from any sulphide of antimony present. The substances which are most advantageous for this purpose are such as remove the impurities from the antimony and also serve as a refining medium. Potash, soda, glauher salt, and other alkaline substances are used.

"The reduction is carried out in reverberatory furnaces, in shaft furnaces, and occasionally in crucibles in pot furnaces.

"The reverberatory furnace process is simple and easily controlled, but is accompanied by considerable loss of antimony, and is therefore only used where ores are rich and raw fuel cheap. Antimony trioxide formed in the volatilizing roasting is reduced to regulus of antimony in pots.

"The shaft furnace method causes less loss of antimony than the former one, and is less expensive, but presents technical difficulties. It is necessary to form a protecting slag which shall be sufficiently thin and fusible to protect the separated antimony from volatilization and from oxidation by the air blast. It may be employed for ores which are too poor in antimony to be smelted in reverberatory furnaces.

"Antimony ores are only exceptionally heated in crucibles, as the cost of fuel and labor is very high. The oxide, however, is reduced in these, as stated above."

Publications on Lake Superior Copper

The Lake Superior copper region is covered by various publications by the U. S. Geological Survey. The latest is Monograph 52, entitled "The Geology of the Lake Superior Region." It is by C. R. Van Hise and C. K. Leith. In addition there are the regular chapters of the annual reports on Mineral Resources. Also Monograph 5, "The Copper Bearing Rocks of Lake Superior," by R. D. Irving, has much interesting information on this subject. This monograph is out of print, but can be secured in most libraries.

PEAT INDUSTRY GRADUALLY IS BEING STABILIZED

Experience in the production of peat, gradually is resulting in the placing of this industry on a firm foundation. Prof. Charles A. Davis, of the U. S. Bureau of Mines, just has returned from several months spent in field work in one of the peat regions of Maine and in visiting peat-producing plants throughout the country.

Mr. Davis spent most of the summer in the southwestern part of Maine. He covered both the fresh and the salt water marshes with considerable thoroughness. This is the first time that this area has been inspected systematically with the idea of determining the extent of the occurrence of peat. Mr. Davis reports that some areas look very promising. His investigations will be covered in detail in a report which he will write.

While there has been no great increase in the amount of peat produced, or no particular increase in the capacity of plants, Mr. Davis found that most of the better conducted plants are making satisfactory profits.

Professor Davis, in connection with working up the data gathered this summer, also will continue his work on oil shales. This latter work is being done in cooperation with the U. S. Geological Survey.

The peat work in Maine was done by the Bureau of Mines, in cooperation with the U. S. Geological Survey and with the Geological Survey of Maine.

ACTIVE GOLD MINING IN PROGRESS NEAR WASHINGTON

It is not widely known that gold is produced within 14 miles of the National Capital.

This is the case, and the Ford mine, which is one mile west of the town of Potomac, Md., recently has changed hands and arrangements are being made for more comprehensive development.

The Harrison farm just east of the Ford property also has been sold and extensive prospecting is to begin.

The gold in this general area, which contains a number of small mines, is found in pockets, some of which are quite large. One pocket opened a few years ago contained \$7,400 worth of gold.

It was in this district that General Sawyer several years ago expended more than a million dollars in the development of the Sawyer mine. He erected a ten stamp mill on the property and did several hundred feet of drifting.

After several years' operation it was found impossible to extract the ore profitably, due to the large amount of dead work which had to be done between the occurrences of the pockets of gold.

Still there has been considerable interest in this district, and numerous transactions in mining property are recorded every year.

It is probable that mining in a small way will continue in southern Maryland for many years.

SELBY COMMISSION REPORT IS FAVORABLE TO OPERATORS OF SMELTERS

Installation of Bag House and Sintering Machines Resulted in Abatement of Nuisance, Experts Find—Much of Damage Claimed Result of Outside Causes, It is Pointed Out.

There is much consolation to smelter owners in the report of the Selby Smelter Commission, which just has been made public by the Bureau of Mines. In its 528 pages this report goes into the subject of damages by smelter smoke with a thoroughness which is most commendable. In general the conclusions are favorable to operators of smelters. It shows that much damage attributed to smelter smoke was of vastly different origin.

The commission consisted of J. A. Holmes, Director of the Bureau of Mines, chairman; Edward C. Franklin, Professor of Organic Chemistry, Leland-Stanford Junior University, and Ralph A. Gould, chemical engineer, secretary of the commission, in immediate charge of the investigations.

The commission concludes:

1. With respect to the visible element of the smoke from the Selby smelter:

(a) That prior to April 1, 1914, a nuisance, measured by the cumulative injury done to certain horses, was maintained in the smoke zone.

(b) That the installation of the bag house in connection with the sintering machines of the smelter has resulted in the abatement of this nuisance.

(c) That lead and arsenic from the smoke of the Selby smelter was deposited on the soil of the smoke zone the period of time included between the beginning of operations of the smelter and April 1, 1914, and that the quantity of these metals so deposited was of no economic importance and did not poison the soil or in any way produce a loss or reduction of crops.

(d) That the blackened appearance of many trees and plants in the smoke zone, which appearance is believed by many of the residents of the smoke zone to be due to a deposit of lead from the smelter smoke, is in fact not due to such cause. The so-called "lead deposit" results from the growth of a mold within the honeydew secreted by certain insects which infest the trees and plants and contains no lead whatever.

2. With respect to the sulphur dioxide contained in the smoke of the Selby smelter:

(a) That the Selby smelter has not maintained a nuisance with respect to producing within the smoke zone a disagreeable or objectionable odor, or with respect to disagreeably or injuriously affecting the throat and lungs of human beings or domestic animals living in the smoke zone.

(b) That the rare instances during the investigations of the commission when sulphur dioxide from the Selby smelter was present in the smoke zone in sufficient concentrations to be observed by the residents by the sense of smell do not constitute a nuisance; nor do these rare visitations prevent the residents of the smoke zone from the peaceful enjoyment of life and property.

(c) That the Selby smelter has not maintained a nuisance with respect to economic damage to trees, vines, shrubs, or growing crops of any kind within the smoke zone.

(d) That the Selby smelter has not maintained a nuisance with respect to the corrosion of wire screens or barbed wire in use within the smoke zone.

3. With respect to the future operation of the Selby smelter:

(a) That so long as the mechanical devices now used at the Selby smelter for clearing the smoke of the plant of its visible element are kept in operation the Selby smelter will not maintain a nuisance with reference to injury to horses or other domestic animals, or with reference to injury to the soil of the smoke zone; nor will a nuisance be maintained by the Selby smelter in these respects so long as the visible element is removed from the smoke by any means mechanical or otherwise.

(b) That the apparatus now installed at the Selby smelter which are used to eliminate the visible element of the smoke are subject to accident and are so constructed as to require occasional cleaning and repairing; and that, for the purpose of cleaning and repairing the apparatus so used, the Selby Smelting & Lead Co. will not maintain a nuisance in the smoke zone if it discharges visible smoke from the blast-furnace stack for a total period of no more than forty-eight hours in any one month of each calendar year; or if it discharges visible smoke from the roaster stack for a total period of no more than forty-eight hours in any one month of each calendar year.

(c) That during that portion of the year known as the "closed season"—that is, from March 15 to November 15 of each year—the emission of smoke into the atmosphere from the furnace known as the Ropp roaster will be productive of a nuisance in the smoke zone unless the visible element is removed from the smoke before it is discharged into the atmosphere.

(d) That so long as the total output of sulphur dioxide which is discharged through all of the stacks of the Selby smelter into the atmosphere is less than 80 tons per day of twenty-four hours during each hour of which day less than $3\frac{1}{3}$ tons of sulphur dioxide are discharged the smelter will not maintain a nuisance with respect to a disagreeable or objectionable odor or with respect to disagreeably or injuriously affecting the throat and lungs of human beings or domestic animals living within the smoke zone; that the smelter will not maintain a nuisance with reference to economic damage to trees, shrubs, vines, or growing crops of any kind growing within the smoke zone; that the smelter will not maintain a nuisance with reference to the corrosion of wire screens or barbed wire in use within the smoke zone; and that no nuisance of any kind will be maintained within the smoke zone with respect to sulphur dioxide under the above-stated conditions of operation.

The commission therefore finds, and so makes answer to the requirements of the stipulation, that the Selby Smelting & Lead Co. in the operation of its plant near Vallejo Junction, Contra Costa County, Cal., was, at the time of the organization of the commission, violating the terms of the decree of the injunction issuing from the Superior Court of Solano County, Cal., and was maintaining a nuisance with respect to cumulative injury to certain horses within the area of the southern portion of Solano County heretofore designated as the smoke zone; but that in installing proper apparatus for the elimination of the visible element of the smoke discharged from the plant the said Selby Smelting & Lead Co. has since April 1, 1914, complied in all respects with the terms of the decree of injunction both in letter and in spirit, and has not since that time and up to the present time, November 6, 1914, violated the terms of the said decree or maintained a nuisance in the area of the southern portion of Solano County, Cal., heretofore designated as the smoke zone.

The commission finds and makes known that by continuing the elimination of the visible element from the smoke discharged into the atmosphere from its plant near Vallejo Junction, Contra Costa County, Cal., and at all times maintaining the total output of sulphur dioxide from said plant at less than 80 tons per day of twenty-four hours, during each hour of which day less than $3\frac{1}{3}$ tons of sulphur dioxide are discharged, during the period of each year covered by the said injunction decree, then the Selby Smelting & Lead Co. will not violate the terms of the said decree of injunction and will not maintain a nuisance within the area of the southern portion of Solano County, Cal., heretofore designated as the smoke zone.

The commission finds and makes known that, by discharging visible smoke from the blast-furnace stack, during the cleaning or repairing of the apparatus by which the visible smoke is eliminated, for a total period of no more than forty-eight hours in any one month of the period covered by the said decree of

injunction; or by discharging visible smoke from the roaster stack, during the cleaning or repairing of the apparatus by which the visible smoke is eliminated, for a total period of no more than forty-eight hours in any one month of the period covered by the said decree of injunction the Selby Smelting & Lead Co. will not violate the terms of the said decree of injunction and will not maintain a nuisance within the area of the southern portion of Solano County, Cal., heretofore designated as the smoke zone.

The commission finds and makes known that, if the Selby Smelting & Lead Co., as the result of conditions of operation that may arise in the future, desires to use the furnaces known as the Ropp roaster during the period known as the "closed season," then, if the smoke from the said furnace is so treated before it is discharged into the atmosphere as to remove the dust and fume therefrom, the said company will not violate the terms of the said decree of injunction and will not maintain a nuisance within the area of the southern portion of Solano County, Cal., heretofore designated as the smoke zone, during the period covered by the said decree of injunction.

DO NOT BELIEVE RUMOR OF CORNER ON SPELTER

Not much stock in the rumor of a corner on spelter in England is taken by experts here. The recent statements that shells are not being remelted also is not believed. Information available here is that shells are used thirty or forty times.

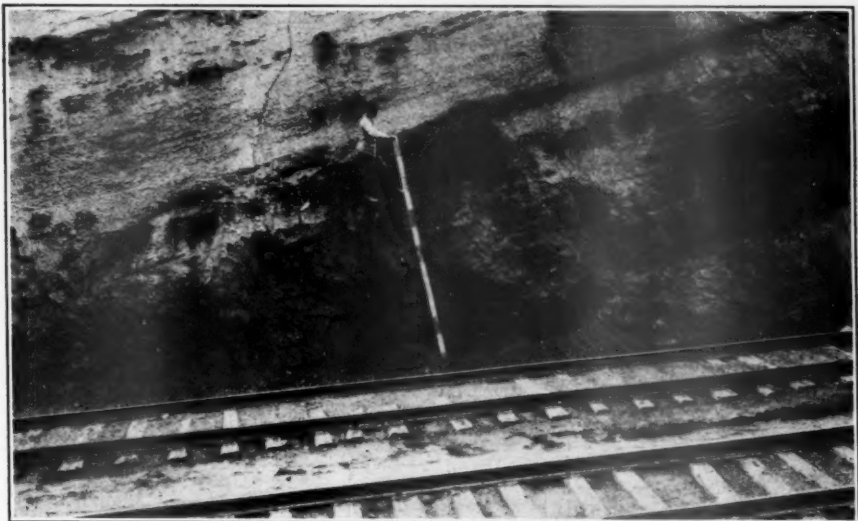
No very serious attempts are being made to forecast the trend of spelter prices. There are so many factors in the situation which cannot be known. Much depends on the length of the war.

It is not believed that the Germans are piling up any great quantities of zinc. Their demands for this metal are huge and with their need of men, it is considered very unlikely that large stocks are being accumulated at any point in Germany. It also is pointed out that even if the Allies were able to push far enough into Belgium to gain control of the Belgium zinc smelters, that both mines and smelters would be rendered useless by the Germans before they gave up the territory. Their rehabilitation would require months and possibly years.

Under no circumstances that can be foreseen will America be displaced as the principal source of zinc supply during the war. The output of zinc in this country is now more than two-thirds greater than it was before the war.

That war is using more zinc than is consumed in peace times is an impression which evidently is held widely. This is not the case, as statistics show. The consumption of spelter is considerably less, but the area producing it is so restricted that it results in an increase in the demand in the United States.

The regulation shell contains seventy-two parts of copper and twenty-eight parts of zinc.



COAL VEIN AT HANNA, WYO.
Eleven feet of good coal exposed in railroad cut.

ST. FRANCIS MOUNTAINS OLDEST ROCKS IN MISSOURI

The "Ozark Mountains" is a popular term covering the elevated, more or less rough, country known more precisely as the Ozark Uplift. It is bounded by the Arkansas Valley on the south, the Grand, Osage, Spring, and Missouri River valleys on the west and north, and by the Mississippi River lowlands on the east. In this area there are two regions of pronounced mountainous character, the Boston Mountains, parallel to the Arkansas Valley, and the St. Francis Mountains in the eastern part. The latter mountains cover a region about fifty miles in diameter. The rocks composing them are igneous for the most part, are the oldest rocks in Missouri, being of pre-Cambrian age and probably have been land at all times since their first upheaval. The other rocks of the Ozark region are sedimentary, were laid down around the St. Francis Mountains as a nucleus, and are therefore younger. The Ozark region, exclusive of the St. Francis Mountains, has alternated between land and sea conditions a number of times but finally assumed practically its present altitude at the close of Carboniferous time. From the standpoint of the date of their uplift into mountains, therefore, the St. Francis Mountains are pre-Cambrian and the Ozark "Mountains" are post-Carboniferous.

The Laurentian Hills of Canada, sometimes called the "Canadian Shield" are part of a large Archean area in Canada, embracing Labrador, most of Quebec and Ontario and a large area west of Hudson's Bay. The mountainous parts of this area are very old, dating from the late Archean. There are Archean rocks in Maine,

New Hampshire, the Adirondacks, and old "Appalachia," a term applied to the Archean area reaching from Maryland to Alabama. The mountains in this area, such as the Great Smoky Mountains, likewise date back to the Archean. The Appalachian Mountains proper, embracing the Blue Ridge and Alleghanies, are much younger, like the Ozarks, dating from the close of the Carboniferous. The Rocky Mountains are younger still, dating from the close of the Cretaceous.

OLD TIME MINING CAMP IS BEING REOPENED

The development of the flotation process has made possible the opening of the old Belmont mining camp in Nevada. This camp in the 60's and 70's was one of the most noted districts in the Southwest. The old dumps are being reworked and a number of the old mines are being reopened. It is a silver camp, the ore carrying very little gold.

As the treatment of the dumps is still in an experimental stage, those operating the plants do not desire to give out the amount of saving that is being made, but it is understood that the results obtained thus far are very encouraging.

Belmont is the old county-seat of Nye County. It was from Belmont that Jim Butler discovered the Tonapah camp.

Use More Sulphate of Copper

Sulphate of copper is finding greatly increased use in agricultural sprays and insecticides.

Recent Patents of Interest to Miners

ASSIGNED TO JEFFREY MFG. CO.

Mining Machine Chain, No. 1,159,861. This invention is by George B. Norris and Curtis C. Marshall of Columbus, Ohio, who have assigned it to the Jeffrey Manufacturing Co. of Columbus, Ohio.

It relates to improvements in cutter chains for coal mining machines. The object of the invention is to provide a chain of strong and simple construction which will furnish rigid support for the cutters and will run smoothly in its guides.

The mining machine chains commonly used have the cutters supported entirely by the cutter links. The length of the links between the pivotal connection is necessarily short, and the tendency is for the forces acting on the cutters to throw the forward end of the link outward. This causes a correspondingly greater pressure on the inner end and the tendency of the links to tilt causes much unnecessary friction, according to the inventors. For their chain, however, it is claimed that the effect is to increase the length of the base along which the force from any one cutter is distributed. Their invention is such, they state, that there is no tendency toward a tilting of the links.

ASSIGNED TO A. S. & R. CO.

Electrolytic Refining of Tin, No. 1,157,830. This invention is by Robert L. Whitehead, of Perth Amboy, N. J. It has been assigned to the American Smelting & Refining Co., of Maurer, N. J.

It relates to improvements in the production of electrolytically refined tin from impure tin cast in the form of anodes.

With regard to the practice of the invention Mr. Whitehead says:

"In the practice of the invention, I first produce from the impure tin itself, an electrolyte of such a character that it will insure the continued maintenance of the electrolytic deposition of the tin during the refining operation and which will itself be devoid of lead, which is an impurity usually present in the tin to be refined. So also, after the electrolyte has been initially produced, I maintain its purity, during the refining operation, by still further continuing to exclude the entrance of lead from the tin anodes into the electrolyte. The tin anodes usually contain gold, silver, or other values, in addition to lead, and I find that all of these adhere for the most part, as slimes, to the anodes, and may be removed therewith at the termination of the electrolytic treatment; or, in part, they fall to the bottom of the electrolytic tank, from which they may be withdrawn, when occasion requires.

"The expedient that I employ for preventing the entry of lead into solution in the electrolyte from the impure tin anodes is to employ in the electrolyte, during its preliminary formation and subsequently during the deposition of the tin therefrom upon the cathodes an agent which will convert the lead into a compound insoluble in the electrolyte. The agent that I prefer to employ for the purpose is sulphuric acid, which serves to convert the lead into lead sulphate, insoluble in the electrolyte which I employ."

ASSIGNED TO NEW JERSEY ZINC CO.

Separation of Minerals by Flotation, No. 1,159,713. This invention is by Lewis G. Rowand, of Brooklyn, N. Y. It is assigned to the New Jersey Zinc Co., of New York City.

It relates to improvements in the separation of metalliferous values from ores and slimes wherein the minerals to be separated are associated with gangue or other minerals not susceptible of selective flotation by the oil emulsion or the like, employed for that purpose.

The characteristic feature of the invention, according to Mr. Rowand, consists in feeding the material to be treated upon a traveling belt or other movable surface, which received a layer of the separating oil by contact with a suitable source of supply, and which feeds the material into a flotation tank, so that it will enter the water in the tank at the surface. The particles susceptible of flotation will be floated off into a collecting trough and the particles not capable of flotation will drop through the water and will be collected separately as tailings.

In passing down the incline the metalliferous particles to be separated will take on a surface coating of oil, whereas the particles which have no tendency to become coated remain unaffected. Consequently, when a mass of material is fed at a moderate rate upon the surface of the water, the coated particles, representing corresponding metalliferous values, will be buoyed up and floated off into the collecting trough, whereas the uncoated particles will fall by gravity to the bottom of the flotation tank.

LARGE AMALGAMATING AREA

Apparatus for Extracting Precious Metals, No. 1,160,485. This invention is by Victor I. Zachert, of San Francisco, and Pierre A. Brangier, of Agnew, Cal. One-third of it is assigned to Victor G. Bonaly, of San Francisco.

It is one of the objects of this invention to overcome various of the difficulties which surround ordinary methods of treatment and

to provide a simple, substantial, easily operated amalgamator which is capable of offering a large active amalgamating surface in which the pulp is advanced automatically without contamination with the ingressing pulp, in such a manner that every metal particle will be given ample opportunity to come in contact with the plates or mercury which are used to form the amalgam.

TO SEPARATE BLENDE AND GALENA

Process for Industrial Separation of Lead and Zinc Contained in the State of Sulphides, No. 1,157,153. This invention is by Guy de Bechi, of London.

Its object is to effect the separation of blende and galena in ores in which these substances are intimately mixed.

LARGE CRUSHING MACHINE

Ore Grinding Machine, No. 1,158,259. This invention is by Charles O. Michaelsen, of Omaha, Neb.

It relates to machines for grinding, crushing and pulverizing hard or soft ores, silica, gypsum, talc, shale, carbon or the like.

The idea is to provide a machine of large capacity. It employs the flat surfaces of two plates which oscillate. In a cycle of oscillation the plates alternately slide past each other in opposite directions, changing this direction for each semi-oscillation. The distance between the plates increases and decreases in the course of the movement.

ELECTRIC FEED

Magnetic Ore Separator, No. 1,157,543. This invention is by August F. Jobke, of Wilkesburg, Pa.

One of the objects of the invention is to provide electrical means for feeding ore into a magnetic field by gravity and subjecting the gravity fed ore to an undulatory movement that causes the ore to be thoroughly agitated so as to expose such particles that are subjectable to a magnetic field, thereby allowing the magnetic field to attract such particles as would be covered and escape the magnetic field if the ore were carried through without being agitated.

OTHER PATENTS

Other patents granted were: No. 1,157,176, to Thomas M. Owens, of Sidney, New South Wales, Austria, separation of metallic sulphides from ores, assigned to Edward W. Culver, Sidney, New South Wales, Australia. No. 1,158,671-72-73-74-75, to Francis C. Frary, Minneapolis, Minn., and Sterling N. Temple, St. Paul, Minn., hard lead alloys, Temple assigns one-sixth of the whole right to Frary. No. 1,159,154, to Edgar A. Ashcroft, of London, England, apparatus for the electrolytic manufacture of alloys of light metals with heavier metals and the continuous treatment of such alloys for obtaining final products.

No. 1,159,154, to William Kowalski, Chicago, Ill., safety device for mining cars. No. 1,158,777, to A. I. Blair, Seattle, Wash., coal washer. No. 1,158,875, to O. J. Warman, of Cincinnati, Ohio, metal furnace, assignor, to the Buckeye Products Co., Cincinnati, Ohio. No. 1,158,913, to Hugh A. Leslie, Glasgow, Scotland, treatment of ores by the cyanide process. No. 1,158,514, to Hugh N. Leslie, Glasgow, Scotland, extraction of metals from their ores. No. 1,160,067, to Charles Goyn, of Gorman, Colo., mine car lubricator. No. 1,159,989, to Dmitry Alexandrowitch Peniakoff, of Brussels, Belgium, process of producing nitrogen compounds of aluminum and alkali or alkaline earth metals. No. 1,160,847, to Adolf Clemm, of Mannheim, Germany, chlorids or alkali earth chlorids. No. 1,160,431, to Grenville Mellen, of E. Orange, N. J., process for producing aluminum from clay, kaolin, and other aluminum silicates, assignor of one-half to the United Aluminum Ingot Co., of New York. No. 1,160,430, to Grenville Mellen, Mt. Vernon, N. Y., process for melting aluminum or aluminum alloys. No. 1,160,660, to Jos. Secrist, of Nuttallburg, W. Va., mining machine. No. 1,160,502, to Frank Franz and E. R. Day, of Wallace, Idaho, ore-jig. No. 1,160,463, to Nils Testrup, London, England and Thomas Rigby, Dumfries, Scotland, assignors to the Wetcarbonizing Co., Limited, London, England, treatment of peat. No. 1,160,509, to William R. Heslewood, Oakland, Calif., method of smelting and incinerating, assigned to the Hydro Vacuum Smelting Co., Oakland, Calif. No. 1,160,621, to John H. Klefingier, M. W. Kryce and Charles R. Kuyell, of Great Falls, Mont., process for smelting ores. No. 1,157,945, to Nils D. Levin, of Columbus, Ohio, electric motor, assigned to the Jeffery Manufacturing Co., of Columbus, Ohio. No. 1,158,424, to Otto Banner, Easton, Pa., combined thrust and journal bearing, assigned to the Ingersoll-Rand Co., of Jersey City, N. J. No. 1,160,617, to Francis A. Jimerson, Athens, Pa., handle and inlet-controlling-valve construction for pneumatic tools, assigned to the Ingersoll-Rand Co., Jersey City, N. J. No. 1,160,648, to Caid H. Peck, Waverly, N. Y., drill-steel-turning device for percussive fluid-operated drills, assigned to the Ingersoll-Rand Co., of Jersey City, N. J. No. 1,160,562, to Otto Banner, Easton, Pa., covering mechanism for centrifugal blowing-engines, assigned to the Ingersoll-Rand Co., of Jersey City, N. J. No. 1,160,857, to Frederick C. Cosco, Columbus, Ohio, electric locomotive and cable-reeling mechanism, assigned to the Jeffery Manufacturing Co., of Columbus, Ohio.

Compete at Van Houten, N. Mex.

A very successful first-aid meet was held recently at Van Houten, N. Mex. Excellent records were made by the competing teams. A dinner followed the field meet. Moving pictures, furnished by the Bureau of Mines, were shown.



PANARAMA OF THE COAL

Where the Union Pacific Company has developed several valuable coal mines. On the left the overhead Hanna is shown

FOLLOWING GEOLOGIST'S TIP TENNESSEE FINDS OIL FIELD

Tennessee is producing an oil field. Unlike most States of the Union, Tennessee has very little territory in which the formation is favorable to the occurrence of oil and gas. Encouraging results, however, are being obtained in Scott County, just south of the Kentucky line, on the Cumberland plateau.

The first well was brought in last spring. Four wells have been drilled since then, three of which have come in as producers. The principal operations are being conducted by the Oneida Oil & Gas Co., near the town of Oneida.

Development of this district is due to statements made in a Geological Survey report. In this report it is said that this part of the Cumberland plateau holds the best chances for encountering oil and gas.

With its location based on information furnished by the United States Geological Survey, the camp has been characterized by the systematic method of its development. Before drilling W. N. Brown, of Washington, formerly with the Geological Survey, was summoned to do geo-structural mapping. With the geology of the region well worked out, drilling was begun and as a result three producers resulted from four holes. Oil was encountered in the Newman limestone at a depth of 800 feet.

Bendeman & Trees, large Pittsburgh operators, have taken extensive leases in this region and expect to develop them at once.

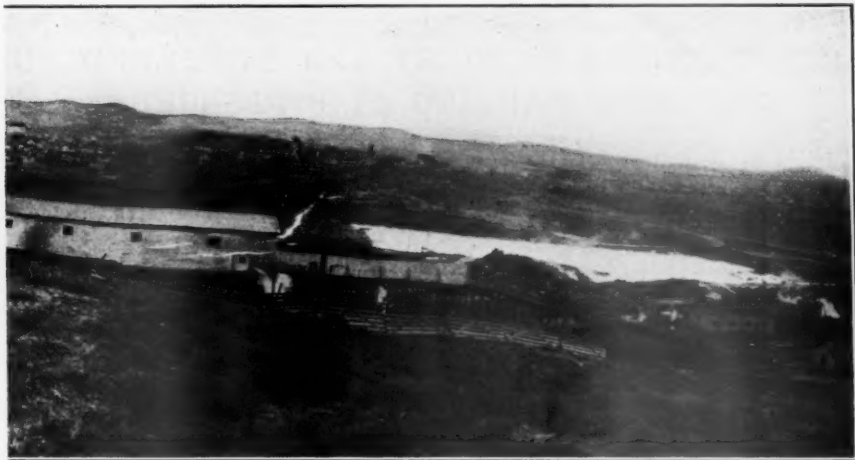
Tennessee is reported as being very proud of its only oil field and it is expected that the area will be the subject of study by the State's geologists.

ANTHRACITE A MANUFACTURING INDUSTRY BUT FEW KNOW IT

"With the acceleration in the production of anthracite due to the fall demand, comes the time-honored request from some retailer unfamiliar with the details of anthracite mining to 'open another chestnut chamber,'" says *Financial America*. The anthracite operators devoutly wish that it were as simple as that, and patiently write to their correspondent that anthracite as it appears at the mouth of the shaft is not fuel at all but a mixture of coal with slate and "bone" and dirt, commonly known as refuse, and that it has to be cleaned and sorted.

All of which goes to show that the knowledge is not yet common that the anthracite coal industry is a manufacturing as well as a mining enterprise, and that 20 per cent of the cost of production comes in putting the coal through the huge breakers erected for that purpose. The coal bill alone for the steam plans of these factories amounts to millions of dollars a year as it is now necessary to burn over 10 per cent of the entire output in order to operate them.

The function of these breakers is to eliminate the refuse and break and sort the coal into the required sizes. The sizing of coal requires a breaking down of the large lumps by means of rolls which are equipped with teeth so arranged as to crush the coal with the production of the least amount of the small and unprofitable sizes. The refuse must be eliminated by the big shakers and by hand on the picking tables. After that, the coal must pass for further refinement over screens, down spiral separators and through a water jig before it is ready for loading.



AREA AT HANNA, WYO.

equipment of the No. 4 Mine. In the foreground are the buildings of the No. 2 Mines. The town of in the background.

DIAMOND-BEARING ROCK HARD TO RECOGNIZE

Information concerning the diamond deposits of Pike County, Ark., has been given in the following Survey reports: Production of gems and precious stones in 1906, 1909 and 1913, and Bulletin 540.

It is not possible to describe the appearance of the soil formed by the weathering of diamond-bearing peridotite rock so that one can recognize definitely such an occurrence without having seen a similar one in another locality. In order to recognize an outcrop of the peridotite rocks it would be best to examine some of the prospects near Murfreesboro, securing samples of both the soil and the underlying rock.

Diamond-bearing earth is not generally washed through a sluice since the diamonds are not heavy enough to be sure of resting in the riffles. A specially designed wash pan or tank is generally used for the separation of diamonds from the matrix. Some of these have been put up at Murfreesboro.

The specific gravity of diamond is about 3.55. Heavy solutions may be used for testing the specific gravity of a diamond. Among these are Klein's solution of cadmium borotungstate in water, having a density of 3.6; Rohrbach's solution of barium-mercury iodide, with a density of 3.59, and Braun's solution of methylene iodide, with a density of 3.33. Diamonds would sink in Braun's solution but float in either Klein's or Rohrbach's.

Topaz is about the only other mineral likely to be confused with diamond which would give the same test and the difference between the diamond and topaz could then be determined by hardness.

GEOLOGISTS AND GEOGRAPHERS TO MEET HERE DEC. 28-JAN. 1

Geologists and geographers from all parts of the United States will be in Washington December 28-January 1, to attend the annual meeting of the Geological Society of America and the Association of American Geographers. Dr. T. W. Vaughan, of the Geological Survey, is chairman of the committee on arrangements. A. H. Brooks, F. L. Ransome and P. S. Smith are chairmen of subcommittees under Dr. Vaughan. This committee has gone to a considerable amount of work to arrange for a successful meeting.

These societies are holding their annual meeting in Washington on the invitation of the Geological Society of Washington.

On the night of December 28 the annual subscription dinner will be given. The Geological Society of Washington will entertain at a smoker in honor of the visiting delegates the night of December 29. The smoker will follow the address of Prof. A. P. Coleman, of Toronto, Canada, the retiring president. An exhibition of instruments used in geographical exploration will be on display the night of December 30. The Round Table Conference of Geographers will be held the night of December 31. This conference will be led by A. H. Brooks. It is expected that the meeting will come to a close by noon January 1.

The program for the day sessions is not complete. The address of the retiring president of the geographers will be heard December 31. R. E. Dodge, of the Teachers' College of New York, is president of the Association of American Geographers.

The sessions of the societies will be held in the auditorium of George Washington Medical School.

RECEPTION AND BANQUET ARE TENDERED TO DIRECTOR MANNING AT PITTSBURGH

Employees of Branch of Bureau of Mines and Faculty of Carnegie Institute of Technology Are Hosts to Mr. Manning—Pittsburgh Work Is Inspected

"Living, he gained men's good opinions and now, dead, he commends this orphan to the care of noble friends."

This was Van H. Manning's text for some informal remarks that he made at a reception tendered him and Mrs. Manning in Pittsburgh by the Carnegie Institute of Technology on the evening of November 8. This affair was attended by more than 600 guests. Before the reception the students of the division of Dramatic Arts presented "The Elder Brother." Following this Dr. A. A. Hamerschlag, director of the institute, presented Mr. Manning. Mr. Manning in responding told concisely of the objects for which the Bureau of Mines is striving.

This was on the occasion of Mr. Manning's first official visit as director of the United States Bureau of Mines to the Pittsburgh branch. Mrs. Manning accompanied the director and they were the objects of much attention.

The theme on which Mr. Manning based his speech refers to the late Dr. James A. Holmes, his predecessor as director of the Bureau of Mines. The Pittsburgh branch of the Bureau of Mines was Dr. Holmes' own idea. He based high hopes on the accomplishments of this part of the work. Mr. Manning thought it very fit that it should be termed an orphan, now that Dr. Holmes has passed to the Great Beyond. For this reason he declared it is doubly the duty of the Federal bureau to see that the orphan is well tended and that there is no lessening of the confidence that Dr. Holmes had in the success of the work at Pittsburgh.

On the following evening Mr. Manning was the guest of honor at a banquet given by the members of the Bureau of Mines at the Pittsburgh station. At this banquet there was no guest table, as the affair was tendered by all employees of the Bureau in Pittsburgh and the unskilled employes contributed just as much to the banquet as did the division chiefs. The men who happened to have the highest figures after their names on the payroll were not placed around a separate table. In consequence the hard-working miner rubbed elbows with the division chiefs. As a result the banquet was a great success and Mr. Manning believes that it will lead to a much closer relationship between the men who all are striving to advance the work that is being carried on by the Bureau.

The object of the trip to Pittsburgh was a thorough inspection of the work that is being

carried on there. Mr. Manning went through the divisions of the branch in detail and obtained first-hand knowledge of just how the work is being conducted there. He was interested greatly in experiments which were in progress in the mine just at the time of his visit. Tests were being made with coal dust from a mine in which an explosion had occurred, costing the lives of a number of the men. This dust was mixed with shale dust and tested out so as to establish the point at which it would lose its explosibility. It was found that the coal dust mixed with 40 per cent of shale dust still would explode. Mixed with 50 per cent of shale dust it was impossible to explode it. Work is continuing to find at what point between 40 and 50 per cent the dust can be made nonexplosible.

Mr. Manning also inspected the work that is in progress on the new building of the Bureau of Mines. The structure will be completed in April, 1917. All excavation has been completed. This work was delayed somewhat by the very hard rock that was encountered. The work should progress rapidly from this point on, Mr. Manning thinks.

COAL IS MOST VALUABLE MINERAL; IRON LEADS METALS

The following is an extract from a letter written to a correspondent by the Geological Survey:

"As to which is the most valuable mineral that is used in this country, it depends upon how you wish to use the term. If you mean which mineral is the most valuable in the aggregate, undoubtedly coal is to be so considered. Iron is the most valuable of the metals. If you mean which mineral is sold for the greatest sum per unit of weight, then radium is probably to be so considered; the market value of which is about \$120,000 per gram (15.4 grains)."

Works on Alloys.

The Geological Survey has published nothing on alloys of lead and tin. Such alloys are treated in the following books. "Mixed Metals," by Arthur H. Hiorns; "Alloys and Their Industrial Applications," by Edward F. Law, and "The Metallic Alloys," by William T. Brannet.

THE MINING CONGRESS JOURNAL

PUBLISHED EACH MONTH BY
THE AMERICAN MINING CONGRESS.
Munsey Building. Washington, D. C.

Subscription Rate, per year..... \$2.00
Single Copies..... .20

Entered as Second Class Matter January 30, 1915,
at the Postoffice at Washington, D. C.

DECEMBER, 1915

EDITORIALS

REVISED MINING LAWS SHOULD BE ENACTED

A large attendance is anticipated at the meeting of the mining men which will be held at Washington, December 16, under the auspices of the Mining and Metallurgical Society of America. It is hoped that special impetus will be given to the campaign looking to the enactment by Congress of a bill providing for a commission which, through public hearings in the principal mining centers of the United States may qualify itself to recommend to Congress a general revision of our mining laws, based upon a complete knowledge of the facts and the judgment of the practical mining men of the country.

Upon another page of this issue will be found the report of the American Mining Congress committee which, for several years, has been agitating this question and urging action of this character upon Congress. This report outlines recent activities of this committee and the results thus far accomplished. The need of general legislation on this subject has long been recognized. The

present laws governing mineral lands and mining operations thereon, have been in process of enactment and adjudication since the year 1866, when the first Congressional act was passed relating to mining. This act has been amended many times.

The rule of reason has been applied by such courts as understood mining conditions, while other courts have handed down decisions so ridiculous as to resemble both farce and fiction. Happily, the sensible decisions have been sustained, and the present system, as developed by the courts, is understandable and fairly workable.

It is generally recognized that a better system can be easily devised by practical men who understand mining conditions, and there has grown up a very general demand for revision but no agreement has been reached as to the particular amendments which are required.

The meeting of representatives of various organizations and interests which is to be held in Washington, December 16, promises to add more strength to the movement, and it is hoped that members of Congress may be made to realize the importance of prompt consideration of this subject.

The plan thus far advocated recommends no specific amendment, but urges a sane, practical plan through which Congress may obtain the information necessary to a complete understanding of the practical problems involved, and be made familiar with the recommendations of the practical men engaged in the business of mining.

PREPARES TO GATHER STATISTICS FOR 1915

Cards are to be sent out soon by the United States Geological Survey so that the producers of mineral products may have an opportunity to register the amount of their production during 1915. It is urged that all mining men cooperate with the Government in this effort to obtain absolutely all possible information in regard to the metal resources of the country.

VOLUNTEERS NEEDED FOR DIFFICULT TASK

One of the most difficult tasks of the officers of the Mining Congress is the selection of committees through which effective work can be accomplished. Particularly difficult has been the effort to select a committee on mining investments and protection to mining investors which could meet with some degree of satisfaction the great responsibilities and opportunities of this particular work.

At the ninth annual convention of the American Mining Congress held at Denver in 1906, then Governor George C. Pardee, of California, as chairman of a committee on this subject, presented to the convention a proposed law, making any misstatement concerning the value of any mining securities offered to the public a felony.

For the few years subsequent, the activities of the Congress in this behalf were directed toward the enactment of this law by the several States, a considerable number of which passed the law either as recommended or with some modifications. The enactment of this law, while it stood as a menace to those making unwarranted statements in order to dispose of mining shares, did not accomplish its full purpose because of a lack of publicity and because no special effort was made to enforce its provisions. The original committee regarded its proposal as a first long step toward preventing the sale of worthless stocks, mining and industrial.

Some time thereafter, the so-called "Blue Sky" law of Kansas came into prominence and public favor, and laws of this character were enacted in many states. This class of laws, while being effective in preventing the sale of stocks without merit, had a tendency to prevent the sale of meritorious stocks, and so far as mining investments are concerned, was practically prohibitive.

In most instances, these commissions were made up of bankers, who, from training and interest, are led to look with disfavor upon mining investments. Some of these laws have been declared unconstitutional, and much criticism has been

leveled against the radical features of nearly all of them.

The creation of conditions which would furnish reasonable protection to the investor in mining stocks, without making entirely prohibitive such investments, would be a great boon to the West, and furnish opportunity for money now seeking investment to find promising opportunities. Upon the other hand, it would lead to the development of many mining prospects, some of which would make productive and profitable mines, bringing development to the sections where located and furnishing for the use of the world the mineral thus produced.

The officers of the Mining Congress will welcome volunteers who will undertake to carry on work along these general lines.

MANNING WANTS BANQUETS CONDUCTED DEMOCRATICALLY

Director Manning, of the Bureau of Mines, made a good point on his recent visit to the Pittsburgh branch of his Bureau. He asked that there be no "high brow" table at a banquet which was tendered him by employees of the Bureau. Mr. Manning and his wife with the division chiefs and their wives, rubbed elbows with miners and their wives at the same table. As a result the banquet was a red-letter event to all.

There may be occasions when the so-called speakers' table is a necessity but as a rule it is rather an undemocratic institution. While few persons will acknowledge it, most guests who are not at the principle table feel a certain resentment. Even the most obscure guest is impressed with his littleness, while real hostility springs up in the breast of the man who considers that he is of sufficient note to be at the principal table himself.

Social standing too often is based on salary. One of the chief causes of friction between labor and capital is that they do not know one another better. Mr. Manning's plan could be used to advantage whenever miners and operators meet at a banquet.

"IF" STANDS OUT PLAINLY IN POTASH SUGGESTION

"If" plays an important part in many calculations. Apparently it has a prominent place in the suggested use of copper tailings as a source of potash. Silicate minerals, however, have been stumbling blocks to chemists since the days of the alchemists. During recent years special efforts have been made to break through the guard of the silicates but none has been successful. So far as known, however, the idea of trying to get potash from silicates never before has been the object of such determined endeavor.

Before the war the incentive to look for potash was not great. Since the cutting off of the German supply efforts have been directed largely toward the discovery of deposits of potash. The necessity of making America independent of Europe in the matter of potash supply is such that any new angle of attacking the problem is welcome.

By pointing out another possible source of potash the Survey calls national attention to a problem. That it will be attacked earnestly by many chemists there is no doubt.

UTAH COPPER COMPANY OUTDOES CANAL EXCAVATING

Without any intent to belittle the remarkable work done by the excavating forces in digging the Panama Canal, attention is called to the fact that the Utah Copper Company excavates considerably more material each working day than was the case on the canal. The weekly average of excavation for the Utah Copper Company is close to 1,000,000 cubic yards. This includes, of course, ore and waste.

The highest weekly record made during the digging of the canal was 750,000 cubic yards.

Considerable importance was attached to the rate of excavation on the Isthmus. Sight was lost of the fact that various private enterprises were maintaining a much higher rate of excavation.

WRECKING OF CHEMICAL WORKS DASTARDLY DEED

A particularly heinous crime seems to have been perpetrated at Wyandotte, Mich., recently when the chemical works at that point was blown up. There were several fatalities and a long list of injured.

The plant was engaged in the manufacture of chlorine. It has been shown by the management that not a pound of this material has been shipped abroad or ever was intended for use by any of the nations at war. The product of the factory is being used entirely in this country.

According to the management there was no opportunity for the explosion, which wrecked the plant, to have been accidental. The damage to the plant was \$500,000.

Chlorine is the gas being used by the armies in France. The fact that the liquid chlorine is easily made and is readily convertible into a heavy gas that hangs near the ground, makes it peculiarly adaptable to such use.

Chlorine is made by electrolyzing salt. It is used largely in this country in detinning scrap. It is also used largely in bleaching.

Before the war, chlorine was a drug on the market. It could not be sold at 1 cent a pound. Shortly after the war opened, it began to rise and is now selling for 10 cents a pound.

LET MINING CONGRESS KNOW IF LAWS ARE NEEDED

If individual miners see the necessity for Federal legislation, they are urged to communicate with the American Mining Congress. It also would be well to take up the matter with the Congressman from the district most interested.

Any such matter brought to the attention of the American Mining Congress will receive careful consideration. The matter will be laid before Congressmen and Senators from the section affected and if it proves that the proposed legislation would be beneficial nationally every effort will be made to urge its presentation to the national body of lawmakers.

NEED OF COOPERATION ACCENTUATED BY WAR

Added attention to the value of cooperation has been brought before the world in a striking manner by the accomplishments of Germany since the beginning of the present war. This object lesson should be studied carefully by the mining men of America. Their industry is one which calls for much scientific research. Much of this research must be national in scope. Consequently there is no other industry in the United States which has a better claim on the Federal Government for aid. Lack of cooperation on the part of mining men is the principal reason why the industry is not receiving as much or more help as agriculture is receiving.

The mining men of the country must get together and make their influence felt. With 1,500 members, the American Mining Congress has been able to accomplish a great deal. What would it not be able to accomplish if it had the support of all who are interested in mining or allied industries? The limited work that the Government authorizes in the interest of the mining industry is hampered greatly by lack of appropriations. The funds of these bureaus are so limited that they are not able to carry out properly many branches of the work that they are expected to look after.

Every effort will be made this year to influence Congress to give more liberally to the mining industry. To accomplish this, however, will require tremendous influence. It is expected that appropriations for national defense will require large sums. In order to supply this money, with as little additional taxation as is possible, it is safe to say that the majority of the members of Congress will be very ready to cut into the meager appropriations allowed bureaus making researches in the interest of the mining industry.

The American Mining Congress representatives will do their utmost. Their influence, however, will increase in the same ratio as does the strength of their organization.

COLLECTIVE BARGAINING

In most of the discussions concerning the importance and the necessity of the organization of labor special stress is placed upon the necessity for "Collective Bargaining." It is claimed, and we believe rightfully, that the individual working man is at a great disadvantage in seeking employment, in competition with every other unemployed workman in his class, and who being impelled by the necessity of earning a living and usually of providing for a family is practically forced to accept a lower wage than he should receive for the service to be rendered in order that he may meet this personal responsibility. This necessity takes from him an important feature of a bargain, viz.: The right that his own mind, without undue pressure, shall be brought to an agreement with the other contracting party, the essential of every valid contract. There can be no question that every contract should represent an independent and essential agreement of minds. Because of this, it is usually acknowledged that "Collective Bargaining" is essential to the protection of the rights of the working man. It is equally essential to the employer.

While the employer consents to the application of this principle to the men, whom he employs, he also should have the right that his mind may meet without undue influence the mind of the other contracting party. Does this privilege exist where the labor organization, with the privilege of "collective bargaining," fully recognized, leaves to the employer the alternative of accepting his terms or closing down his property, and of enforcing the alternative by strikes, boycotts and in many instances, armed resistance to the authorities which undertake to protect the operator's property from incendiarism and dynamite?

Under these conditions the employer is denied a fundamental right, and there is no "collective bargaining" because there is no bargaining at all.

The Mining Congress Journal believes in cooperation in every line of work by which the highest efficiency and the most complete conservation may be made

effective. It does not believe in that kind of cooperation which destroys the right of others, and it does not believe that the settlement of disputes by force or intimidation upon either side can be made effective.

No question is ever settled until it is settled right.

WILL AID CAMPAIGN FOR USEFUL LEGISLATION

The American Mining Congress is much encouraged by the activity of the Mining and Metallurgical Society in the matter of securing a revision of the U. S. mining laws. The Mining Congress has worked alone so long and patiently to this end that it is gratifying to realize that other powerful influences at last are to be exerted in the same direction.

It will be very gratifying to the American Mining Congress if the efforts of the Mining and Metallurgical Society toward securing beneficial legislation will not end with the meeting called for December 16. A meeting of this kind is very beneficial but of vastly more importance is the day-to-day hammering away. It is hard to get lawmakers to sit through technical sessions but they are impressed at the evidence of concentrated effort. The details of the needs of the mining industry must be brought to their attention personally.

Securing friends for legislation favorable to mining is largely a matter of education. No great amount of work has to be done with the lawmakers from mining sections of the country. Men who know little of mining have to be instructed. The number of Congressmen and Senators is so large that it is beyond the present capacity of the Mining Congress to give personal attention to each man who should have detailed information as to the needs of the mining industry. Any organization which will lend a hand in this work may be certain of the most hearty cooperation of the American Mining Congress.

VANDALS LOOT EXHIBIT OF STANFORD UNIVERSITY

A flagrant case of vandalism is that reported from the Panama-Pacific Exposition in the looting of the mineral exhibit of Stanford University. Four diamonds in the rough, two gold nuggets and two platinum nuggets, were stolen. In addition to their intrinsic value, the specimens stolen were prized highly by the Department of Geology of the University and had been secured at a considerable sacrifice and after long effort to obtain them.

DENVER HAS NEW WEEKLY MINING PUBLICATION

Mining Science has become *The Mining American*. *Mining Science*, which was published in Denver, was a monthly. *The Mining American* is a weekly. There is every evidence of lots of "pep" behind *The Mining American*. Edward G. Reinert and Charles J. Downey are the editors and publishers.

Mr. Reinert was the editor of *Mining Science*. The ability of these men is well known. The MINING CONGRESS JOURNAL hopes the new publication will attain success in an unusual degree.

ORIGINAL DRAWINGS OF MAPS VERY VALUABLE

Punishment of an employe of the Geological Survey recently for failing to take the proper precautions to protect an original drawing of a topographic map serves to call attention to the value of these sheets. The Survey provides a specially built safe in which these drawings are guarded. The intrinsic value of these maps varies from \$2,500 to \$6,000, but what is even more important is the length of time that would be required to make a duplicate.

Geologists and others handling these original drawings keep them close at hand. In case of any threatened danger the first thing looked after is the sheet.

MANY TAKE IRON PYRITE FOR GOLD; SEND IT TO SURVEY

The United States Geological Survey calls attention to the fact that it is prohibited by law from making analyses or assays primarily for the use of private parties or corporations. The Survey therefore gives to senders of rock or ore specimens only an offhand opinion, such as would be based on inspection or simple test of these specimens. Persons sending specimens and requesting such simple inspection should be particular to state whether the specimens are to be returned, as otherwise they will be destroyed. It might be a matter of surprise to know the large number of answers prepared daily by the Geological Survey, similar to the following:

"In reply to your letter, etc., . . . the material you send is merely a fragment of a quartz pebble. I regret to say that it has no probable value."

A great many other samples received prove to be iron pyrite, or "fool's gold," the shiny particles being taken by the writers for gold.

If an assay is desired, the proper course is to employ a private assayer or chemist, addresses of many of whom may be found in the technical journals, or to send the specimen to one of the government assay offices, which are located at Carson, Nev.; Seattle, Wash.; Boise, Idaho; Helena, Mont.; Deadwood, S. Dak., and Salt Lake City, Utah, or to the United States Mint at either Philadelphia, Pa., or New Orleans, La., at all of which a regular charge is made for such work.

DELEGATES TO MINING MEETING TO REGISTER AT BUREAU

Those attending the meeting called by the Mining and Metallurgical Society, which is to be held in Washington, December 16, to discuss matters in connection with the revision of mining laws, are expected to register at the Bureau of Mines. Desks will be provided at the Bureau of Mines for the use of mining men attending the meeting.

While the Bureau of Mines has no official connection with this meeting, Director Manning is anxious that every facility that will aid the work in hand, be placed at the disposal of the mining men in attendance.

INADEQUATE FACILITIES HANDICAP MAP WORK

The question regarding the revision of some of its maps is one of the problems that troubles the Survey due to its inability to revise the maps already issued as rapidly as it desires. The engraving division now issues about 110 new maps annually, representing the field work of the topographic engineers. Neither force, however, is large enough to carry on all of the revision work at the same time. The policy is to reprint all maps as soon as stocks on hand are exhausted, with such revisions as are practicable.

HANDLING LONG MAILING LISTS BECOMES A SCIENCE

Miners receiving the routine communications sent from the U. S. Geological Survey, probably do not realize how much equipment is necessary to insure the systematic handling of the long mailing lists.

On its lists the Survey has no less than 125,000 names and addresses.

Machines not unlike the linotype stamp on a metal blank the name and address. This in turn is used to address the envelopes. This stencil will wear indefinitely. It is keyed so that ready reference may be had to this name at any time. The stencil is placed in a holder in which also is placed its imprint. This permits of handling the stencils in filing cases such as those used for card systems.

One of the important reasons for maintaining a list of all the producers of minerals is to keep abreast of production. When requests go out for information in regard to production, a simple device provides for distinguishing those who have replied. If it is necessary to send a second request, all the stencils are placed in the addressing machine which automatically skips those whose replies have been received.

The envelope addressing machine has a capacity of 7,000 an hour. Another machine seals them at even a faster rate. The entire operation of handling the mailing list is mechanical.

This portion of the work has been revolutionized during the past five years. Formerly it was necessary to employ a large number of persons and to consume much more time in handling the mailing lists.

The mechanical equipment of this department also is used in other work. For instance the pay roll, which formerly required two and a half days to write up, is now struck off quickly in three hours. By the old method typographical errors were always possible. By the mechanical means now employed a typographical error is impossible and the amount printed on cash envelope and on payroll must agree, thus saving also the expense of checking these.

This department is directed very ably by Max Abel.

SIMPLE TEST DIFFERENTIATES SCUM OF OIL AND IRON OXIDE

It is very easy to determine whether a scum on water is petroleum or merely an oxide of iron. The test is made by stirring the water with a stick. If it is the oxide of iron, the iridescent scum will break up into small ragged fragments like the breaking up of ice. If it is oil, the scum will not break in that way but will drag with the stick. A wet blanket dipped into oil gathers up a quantity of it and the presence of oil may be confirmed by setting fire to the blanket and observing the combustion and odor.

Supreme Court Decisions

By far the most interesting decision of the Supreme Court at this term is that declaring unconstitutional the Arizona anti-alien act. The complete opinion as written by Justice Hughes, shorn of some of its legal references, is as follows:

Mr. Justice Hughes delivered the opinion of the court.

Under the initiative provision of the constitution of Arizona (Art. IV, sec. 1) there was adopted the following measure which was proclaimed by the Governor as a law of the State on December 14, 1914:

"An act to protect the citizens of the United States in their employment against non-citizens of the United States, in Arizona, and to provide penalties and punishment for the violation thereof.

"Be it enacted by the people of the State of Arizona:

"Section 1. Any company, corporation, partnership, association or individual who is, or may hereafter become an employer of more than five (5) workers at any one time, in the State of Arizona, regardless of kind or class of work, or sex of workers, shall employ not less than eighty (80) per cent qualified electors or native-born citizens of the United States or some sub-division thereof.

"Sec. 2. Any company, corporation, partnership, association or individual, their agent or agents, found guilty of violating any of the provisions of this act shall be guilty of a misdemeanor, and, upon conviction thereof, shall be subject to a fine of not less than one hundred (\$100) dollars, and imprisoned for not less than thirty (30) days.

"Sec. 3. Any employe who shall misrepresent, or make false statement, as to his or her nativity or citizenship, shall, upon conviction thereof, be subject to a fine of not less than one hundred (\$100) dollars, and imprisoned for not less than thirty (30) days." Laws of Arizona, 1915. Initiative Measure, p. 12.

Mike Raich (the appellee), a native of Austria and an inhabitant of the state of Arizona but not a qualified elector, was employed as a cook by the appellant, William Truax, Sr., in his restaurant in the city of Bisbee, Cochise County. Truax had nine employes, of whom seven were neither "native-born citizens" of the United States nor qualified electors. After the election at which the act was passed, Raich was informed by his employer that when the law was proclaimed, and solely by reason of its requirements and because of the fear of the penalties that would be incurred in case of its violation, he would be discharged. Thereupon, on December 15, 1914, Raich filed this bill in the

District Court of the United States for the District of Arizona, asserting among other things that the act denied to him the equal protection of the laws and hence was contrary to the Fourteenth Amendment of the Constitution of the United States. Wiley E. Jones, the attorney general of the State, and W. G. Gilmore, the county attorney of Cochise County, were made defendants in addition to the employer Truax, upon the allegation that these officers would prosecute the employer unless he complied with its terms and that in order to avoid such a prosecution the employer was about to discharge the complainant. Averring that there was no adequate remedy at law, the bill sought a decree declaring the act to be unconstitutional and restraining action thereunder.

Soon after the bill was filed, an application was made for an injunction *pendente lite*. After notice of this application, Truax was arrested for a violation of the act, upon a complaint prepared by one of the assistants in the office of the county attorney of Cochise County, and as it appeared that by reason of the determination of the officers to enforce the act there was danger of the complainant's immediate discharge from employment, the district judge granted a temporary restraining order.

The allegations of the bill were not controverted. The defendants joined in a motion to dismiss upon the grounds (1) that the suit was against the State of Arizona without its consent; (2) that it was sought to enjoin the enforcement of a criminal statute; (3) that the bill did not state facts sufficient to constitute a cause of action in equity; and (4) that there was an improper joinder of parties and the plaintiff was not entitled to sue for the relief asked. The application for an interlocutory injunction and the motion to dismiss were then heard before three judges, as required by section 266 of the Judicial Code. The motion to dismiss was denied and an interlocutory injunction restraining the defendants, the attorney general and the county attorney, and their successors and assistants, from enforcing the act against the defendant Truax was granted. This direct appeal has been taken.

As the bill is framed upon the theory that the act is unconstitutional and that the defendants, who are public officers concerned with the enforcement of the laws of the State, are about to proceed wrongfully to the complainant's injury through interference with his employment, it is established that the suit cannot be regarded as one against the State.

It is also settled that while a court of equity, generally speaking, has "no jurisdiction over

the prosecution, the punishment or the pardon of crimes or misdemeanors" a distinction obtains, and equitable jurisdiction exists to restrain criminal prosecutions under unconstitutional enactments, when the prevention of such prosecutions is essential to the safeguarding of rights of property. The right to earn a livelihood and to continue in employment unmolested by efforts to enforce void enactments should similarly be entitled to protection in the absence of adequate remedy at law. It is said that the bill does not show an employment for a term, and that under an employment at will the complainant could be discharged at any time for any reason or for no reason, the motive of the employer being immaterial. The conclusion, however, that is sought to be drawn is too broad. The fact that the employment is at the will of the parties, respectively, does not make it one at the will of others. The employee has manifest interest in the freedom of the employer to exercise his judgment without illegal interference or compulsion and, by the weight of authority, the unjustified interference of third persons is actionable although the employment is at will. It is further urged that the complainant cannot sue save to redress his own grievance; that is, that the servant cannot complain for the master, and that it is the master who is subject to prosecution, and not the complainant. But the act undertakes to operate directly upon the employment of aliens and if enforced would compel the employer to discharge a sufficient number of his employees to bring the alien quota within the prescribed limit. It sufficiently appears that the discharge of the complainant will be solely for the purpose of meeting the requirements of the act and avoiding threatened prosecution under its provisions. It is, therefore, idle to call the injury indirect or remote. It is also entirely clear that unless the enforcement of the act is restrained the complainant will have no adequate remedy, and hence we think that the case falls within the class in which, if the unconstitutionality of the act is shown, equitable relief may be had.

The question then is whether the act assailed is repugnant to the Fourteenth Amendment. Upon the allegations of the bill, it must be assumed that the complainant, a native of Austria, has been admitted to the United States under the Federal law. He was thus admitted with the privilege of entering and abiding in the United States, and hence of entering and abiding in any State in the Union. Being lawfully an inhabitant of Arizona, the complainant is entitled under the Fourteenth Amendment to the equal protection of its laws. The description—"any person within its jurisdiction"—as it has frequently been held, includes aliens. "These provisions" (referring to the due process and equal protection clauses of the amendment), "are universal in their application, to all persons within the territorial jurisdiction, without regard to any differences of race, color, or of nationality; and the equal protection of the

laws is a pledge of the protection of equal laws." The discrimination defined by the act does not pertain to the regulation or distribution of the public domain, or of the common property or resources of the people of the State, the enjoyment of which may be limited to its citizens as against both aliens and the citizens of other States. Thus in *McCready vs. Virginia*, 94 U. S. 391-396, the restriction to the citizens of Virginia of the right to plant oysters in one of its rivers was sustained upon the ground that the regulation related to the common property of the citizens of the State, and an analogous principle was involved in *Patsone vs. Pennsylvania*, 232 U. S. 138, 145, 146, where the discrimination against aliens upheld by the Court had for its object the protection of wild game within the States with respect to which it was said that the State could exercise its preserving power for the benefit of its own citizens if it pleased. The case now presented is not within these decisions, or within those relating to the devolution of real property. It should be added that the act is not limited to persons who are engaged on public work or receive the benefit of public moneys. The discrimination here involved is imposed upon the conduct of ordinary private enterprise.

The act, it will be observed, provides that every employer (whether corporation, partnership, or individual) who employs more than five workers at any one time "regardless of kind or class of work, or sex of workers" shall employ "not less than 80 per cent qualified electors or native-born citizens of the United States or some subdivision thereof." It thus covers the entire field of industry with the exception of enterprises that are relatively very small. Its application in the present case is to employment in a restaurant, the business of which requires nine employees. The purpose of an act must be found in its natural operation and effect, and the purpose of this act is not only plainly shown by its provisions, but it is frankly revealed in its title. It is there described as "An act to protect the citizens of the United States in their employment against non-citizens of the United States, in Arizona." As the appellants rightly say, there has been no subterfuge. It is an act aimed at the employment of aliens, as such, in the businesses described. Literally, its terms might be taken to include with aliens those naturalized citizens who by reason of change of residence might not be at the time qualified electors in any subdivision of the United States, but we are dealing with the main purpose of the statute, definitely stated, in the execution of which the complainant is to be forced out of his employment as a cook in a restaurant, simply because he is an alien.

It is sought to justify this act as an exercise of the power of the State to make reasonable classifications in legislating to promote the health, safety, morals and welfare of those within its jurisdiction. But this admitted authority, with the broad range of legislative discretion that it implies, does not go so far

as to make it possible for the State to deny to lawful inhabitants, because of their race or nationality, the ordinary means of earning a livelihood. It requires no argument to show that the right to work for a living in the common occupations of the community is of the very essence of the personal freedom and opportunity that it was the purpose of the amendment to secure. If this could be refused solely upon the ground of race or nationality, the prohibition of the denial to any person of the equal protection of the laws would be a barren form of words. It is no answer to say, as it is argued, that the act proceeds upon the assumption that "the employment of aliens unless restrained was a peril to the public welfare." The discrimination against aliens in the wide range of employments to which the act relates is made an end in itself and thus the authority to deny to aliens, upon the mere fact of their alienage, the right to obtain support in the ordinary fields of labor is necessarily involved. It must also be said that reasonable classification implies action consistent with the legitimate interests of the State, and it will not be disputed that these cannot be so broadly conceived as to bring them into hostility to exclusive Federal power. The authority to control immigration—to admit or exclude aliens—is vested solely in the Federal Government. The assertion of an authority to deny to aliens the opportunity of earning a livelihood when lawfully admitted to the State would be tantamount to the assertion of the right to deny them entrance and abode, for in ordinary cases they cannot live where they cannot work. And, if such a policy were permissible, the practical result would be that those lawfully admitted to the country under the authority of the acts of Congress, instead of enjoying in a substantial sense and in their full scope the privileges conferred by the admission, would be segregated in such of the States as chose to offer hospitality.

It is insisted that the act should be supported because it is not "a total deprivation of the right of the alien to labor;" that is, the restriction is limited to those businesses in which more than five workers are employed, and to the ratio fixed. It is emphasized that the employer in any line of business who employs more than five workers may employ aliens to the extent of 20 per cent of his employees. But the fallacy of this argument at once appears. If the State is at liberty to treat the employment of aliens as in itself a peril requiring restraint regardless of kind or class of work, it cannot be denied that the authority exists to make its measures to that end effective. If the restriction to 20 per cent now imposed is maintainable, the State undoubtedly has the power if it sees fit to make the percentage less. We have nothing before us to justify the limitation to 20 per cent save the judgment expressed in the enactment and if that is sufficient, it is difficult to see why the apprehension and conviction thus evidenced would not be sufficient were the restriction

extended so as to permit only 10 per cent of the employees to be aliens or even a less percentage, or were it made applicable to all businesses in which more than three workers were employed instead of applying to those employing more than five. We have frequently said that the legislature may recognize degrees of evil and adapt its legislation accordingly, but underlying the classification is the authority to deal with that at which the legislation is aimed. The restriction now sought to be sustained is such as to suggest no limit to the State's power of excluding aliens from employment if the principle underlying the prohibition of the act is conceded. No special public interest with respect to any particular business is shown that could possibly be deemed to support the enactment, for as we have said it relates to every sort. The discrimination is against aliens as such in competition with citizens in the described range of enterprises and in our opinion it clearly falls under the condemnation of the fundamental law.

The question of rights under treaties was not expressly presented by the bill, and, although mentioned in the argument, does not require attention in view of the invalidity of the act under the Fourteenth Amendment.

REYNOLDS DISSENTS

Justice McReynolds, dissenting, said:

I am unable to agree with the opinion of the majority of the court. It seems to me plain that this is a suit against a State to which the Eleventh Amendment declares "the judicial power of the United States shall not be construed to extend." If *Ex Parte Young*, 209 U. S. 123, and the cases following it, support the doctrine that Federal courts may enjoin the enforcement of criminal statutes enacted by State legislatures whenever the enjoyment of some constitutional right happens to be threatened with temporary interruption, they should be overruled in that regard. The simple, direct language of the amendment ought to be given effect, not refined away.

That the challenged act is invalid I think admits of no serious doubt.

Zeckendorf Wins

In the case of Albert Steinfeld, R. K. Shelton, J. N. Curtis, Silver Bell Copper Co., and Mammoth Copper Co. *vs.* Louis Zeckendorf and Hiram W. Fenner, receiver, appealed from and error to the Supreme Court of the State of Arizona, the judgment of the Arizona court was upheld.

Justice Holmes delivered the opinion of the court.

This case came here by appeal from the Supreme Court of Arizona while Arizona was still a territory. Before the decision by this court Arizona became a State, and the judgment, so far as now in controversy, having been reversed, the case was remanded "for such further proceedings as may not be inconsistent with the opinion of this court," the

formula usual in cases coming from a State. The ground for the present attempt to reopen the merits is that the State court has misinterpreted the mandate that it received.

The case is stated at length in the former decision. All that is necessary to explain the present question may be put in shorter form. The suit was brought by Zeckendorf as a stockholder in the Silver Bell Mining Co. to recover money alleged to belong to the company and appropriated by Steinfeld. There was a further cause of action alleged but that has been disposed of. The money represents the proceeds of the Silver Bell mine and a group of mines adjoining the Silver Bell and purchased by Steinfeld, it was assumed by the parties, as trustee for the company. Steinfeld sold all the mines for \$515,000, \$115,000 cash, \$400,000 in notes for \$100,000 each, and his action was confirmed. At the time of the conveyance to the purchaser it was agreed by a contract in writing that the purchase price should belong to the Silver Bell Copper Co., and in the same instrument it was provided that the four notes should be held by Steinfeld as trustee and as security against his personal obligations in the matter. Steinfeld received the cash and the proceeds of the first two notes, paid certain liabilities of the company and deposited the residue, except \$50,000 attached in his hands, in the Bank of California in his own name.

In December, 1903, Zeckendorf brought a suit to restrain the turning over of the deposited funds by the bank to Steinfeld, and on December 26, 1903, a stockholders' meeting was held, at which all parties were represented and a vote of rescission was passed, upon which the present question arises. For Steinfeld it is argued that the whole agreement was rescinded. The other side contends that the rescission went only to the clause giving Steinfeld a right to the personal custody of the money. The directors, consisting of Steinfeld and his creatures, although not understanding the rescission to go beyond the indemnity clause, passed a vote behind Zeckendorf's back under which the proceeds of the sale were divided and one-half given to Steinfeld. After the judgment of this court, the State court conceived itself bound by the mandate to enter judgment for the plaintiff and did so. It now is contended on Steinfeld's part that he never has had his day in court to present his case; for, it is said, the territorial court simply ruled as matter of law that the vote of rescission rescinded the contract *in toto*, and this court, if it thought, as it did, that the ruling was wrong, properly could do no more than to send the case back for a finding of fact as to the true purport of the vote. If this should be done Steinfeld alleges that he has evidence that he wishes to present.

A court is not necessarily precluded from construing a document because the construction is affected by facts and circumstances not open to dispute. But the question now is not whether this court was right or wrong, but what it did. The mandate issued within the

memory of present members of the court, and there is no doubt that the court below did what we intended that it should. In the time of Edward I. Hengham interrupted discussion of the Stat. Westm. II by saying, "We know it better than you, for we made it." However it may be as to a statute, the objection seems reasonable when applied to a mandate that has been followed as it was meant and the following words among others show clearly enough that we expressed our intent: "In our view the facts found show that . . . the subsequent attempt to rescind the action by which the proceeds of the sale of the English group of mines became the property of the Silver Bell Co. and to give the proceeds to Steinfeld must be held for naught." If the territory had not become a State, a judgment would have been ordered. The more reserved phrase was used by reason of the change, but with no change in what consistency with our opinion was deemed to require.

We see no reason for supposing that cases were intended to come to this court from Arizona in other than the usual form. Therefore in any event this appeal would have to be dismissed. To meet this possibility a writ of error was allowed at the last moment. We have considered the record as if made up under the writ. But apart from technical objections that have been urged, the only question that would be open is whether the judgment below was inconsistent with the opinion of this court, and as it very plainly is not, there is no reason for disturbing it. Our mandate was not concerned with the allowance of attorney's fees and some other matters that were argued, and therefore they present no Federal question and need not be considered.

COBALT PRICES DROP AS NEW FACTORY INCREASES THE OUTPUT

The decrease of the price of cobalt from \$225 to \$125, is due, it is believed, to the establishment of the plant of the American Smelting & Refining Co., at Maurer, N. J. This company is turning out increasing quantities of cobalt. It is not only a by-product from the smelting of cobalt-silver ores, but it is believed that anode muds, which are obtained in the electrolytic refining of copper, also are being made the source of cobalt. It is thought also that the speiss accumulated in the treating of Canadian ores is being worked up.

The Katanga ores from Africa which are being treated to the extent of 12,000 tons annually, contain a percentage of cobalt varying from 2.8 to 3.25 per cent.

Mineral Movement Increases

Nitrates, iron and copper ore continue to move through the Panama Canal in increasing quantities, as shown by the reports made to the Panama Canal office in this city.

SENATOR WALSH TELLS OF ACCOMPLISHMENTS BY ANACONDA COPPER COMPANY

Chairman of Senate Committee on Mines and Mining Outlines Work Being Done in
West for Securing Values from Low Grade Ores—Thinks Bureau
of Mines Is Doing Great Work

BY SENATOR THOMAS J. WALSH¹

Turning my thoughts a few evenings ago to what I might say concerning "Our Mineral Resources," I opened a Bible that lay on my desk, and curiously enough at the chapters that tell of the embellishment of Solomon's temple in gold, its altars and furnishings of brass, and the treasures of David in silver and gold stored within it, pursuant to his vow by the filial piety of the wisest of men. The reflection was naturally suggested that when in the primitive age the earth had been made to yield up so much of metallic wealth, there may come a time that will see nature's storehouse exhausted by the ever-increasing demands of industry, and the stupendous draft made by modern methods of mining and reduction. There is some comfort in the fact that with the development of mining and metallurgy deposits are made available that were formerly mere dross and a higher and higher percentage of the metal content of ores is being extracted.

ANACONDA'S ACCOMPLISHMENT

By the best methods available to the Anaconda Copper Mining Company, at a time no more remote than three years ago, 70 per cent of the copper content of the ores went away in the tailings. By treating them by the oil-floatation process and a modernized leaching process lately introduced the ore is reduced to .14 per cent, signifying a recovery of an additional 11.2 pounds of copper from every ton of ore, worth at current prices about \$2 or an added daily extraction by that company of a value not less than \$25,000. By the substitution of electrical energy for steam power, the same company saves 50 cents a ton on the 4,000,000 tons of ore it handles annually. By reason of the saving in operating costs thus effected, it is able to work successfully ores carrying five pounds less copper to the ton of ore than the lowest grade that was of commercial value before the more economical system was installed. Enormous deposits of low grade ores in the Butte camp, whose copper content could not hitherto be reckoned as a part of the world's reserve, will now yield bountously. An interesting peculiarity of that region is that the mineralization was carried on so generously that all traces of the

walls of the veins are, as a rule, obliterated. The mineral solutions penetrated the adjacent country until it became ore as well as the vein filling—but lean in proportion to the distance from the main channel. The economies and metallurgical advances to which reference has been made will permit the mining of a wider body of rock adjacent to most of the great ore channels. In the same way the depth to which economic mining may be carried on is extended. To all intents and purposes new and productive fields have been opened up. Most of the porphyries could yield nothing were it not for the introduction of new methods of mining and new processes of reduction.

TREATS 1 PER CENT COPPER

The Utah Copper Company's mines, mills and smelts its ores at not to exceed \$1.25 per ton, a cost which will permit the profitable treatment of ore carrying no more than 1 per cent of copper. It takes 150,000,000 pounds of copper a year out of a hill that was negligible twenty years ago in any account of the world's reserves of that metal.

The Convey Placer Mining Company operates five dredges—one of which is the largest in the world—in Alden Gulch, the fabulous richness of whose sands gave rise to the first stampede to Montana. It was organized under the direction of Professor Shaler, of Harvard. Operating with steam power it was barely able to pay expenses by confining its activities to so much of the relatively rich ore as the pioneer miners had not taken. It has for a number of years past been using electricity for power and is reaping prodigious profit by cleaning up the whole gulch as its giant machines move forward.

MINERAL WEALTH BEING DEPLETED

The earth yields agricultural wealth without sensible diminution of its capacity under a wise husbandry. Its mineral wealth is suffering constant exhaustion. I learn that the great steel companies are providing against the day of a dearth of ores in this country by acquiring deposit in Cuba and Chili.

In my opinion the prime object of the existence of the Bureau of Mines is the con-

¹An address delivered in Washington at a banquet in honor of Van H. Manning, Director of the Bureau of Mines.

servation of the lives of the men who toil in the mines, and second to that is the conservation of our mineral wealth, by making those stores available to man, that though known are securely locked away. It is up to the Bureau to find the key to these treasure houses. We may trust to the enterprise and ingenuity of the mining engineer to apply known processes to the reduction of deposits that will yield at a profit under such. We must rely on the researches of the Bureau for the development of others that will eliminate waste and place all there is of value in the rocks at the service of man. I am glad to note that experiments are now being made to demonstrate the feasibility of extending potash commercially from mine tailings.

May I be pardoned for suggesting that the most intimate relationship ought to be cultivated between the Bureau and those actually engaged in mining? It is perhaps because it is comparatively new, but I am led to believe that the mining fraternity have not come to rely upon and have recourse to the Bureau of Mines as completely or as freely as is the case with the Geological Survey. There is no department of the Government dealing with industries in which the opportunities for work of a humanitarian character are greater, or in which the promise of material returns excels than the Bureau of Mines. Its friends confidently rely on its meeting every reasonable expectation under the capable management of Mr. Manning.

SURVEY IS COOPERATING IN POTASH EXPLORATIONS

In view of the urgent needs of the country for domestic supplies of potash and nitrate salts sufficient for the growing agricultural and industrial demands, the U. S. Geological Survey, in accordance with Congressional legislation, is making every effort to discover or to assist in the discovery somewhere in this country of deposits of such salts in amounts large enough to be exploited on a commercial scale. With this object in view the Survey is cooperating with prospectors and others.

The Survey will examine, by means of qualitative tests, samples sent in by various correspondents and inquirers provided the samples are accompanied by data as to the locality, source, and such other accessory information as the sender may possess. In some cases analyses will be made, though the Survey is prohibited by law from making such analyses especially at the request of private individuals or corporations, and from communicating the detailed results of such analyses to private parties in advance of publication to the country at large. After such samples have been examined, the senders, whether private individuals or companies, are informed as to whether the samples are rich or lean in potash, nitrate, etc., and some general opinion as to their character may be offered.

The Survey is undertaking as far as possible to have all deposits that are reported circum-

stantially with evidence deserving further investigation, examined by a competent geologist, who makes studies of the geology of the locality and personally collects samples for corroborative tests and analyses, the results of which are made public if of importance. Immediate publicity will be given to any discoveries of commercially important deposits which are so confirmed. In this way a large number of prospects and reported discoveries have been investigated, though it is to be regretted that, with the exception of the deposits in Searles Lake, California, the deposits of water-soluble salts have generally been found either too low in potash or nitrates, or too limited in amount—even though possibly of very high grade—to encourage commercial exploitation.

NOTABLE MINE DEVELOPMENT IN BURRO MOUNTAIN DISTRICT

One of the most notable mine developments in the United States is that of the Burro Mountain Copper Co., which will begin operations in about six months in the Tyrone district of New Mexico.

Sidney Paige, a geologist with the U. S. Geological Survey, just has returned from the Burro Mountain district, after several months spent in investigations there. He declared unqualifiedly that the district is a most promising one. It is a low grade camp and has a large amount of ore blocked out.

The Burro Mountain Copper Co., which is a Phelps-Dodge concern, is spending a large sum of money in order to operate on a large scale. They expect to begin operation on a 500-ton basis. Development is being done on secondarily enriched chalcocite bodies. Drilling also is being conducted in prospecting. While the Burro Mountain Co. is the only one now doing active work in the district, other companies have land in this vicinity and other operations are expected.

A model town is being built by the Burro Mountain company. The houses are being constructed of concrete. A \$50,000 concrete hospital is in course of erection. No expense is being spared to make this a model mining camp.

The ore bodies vary from 2 to 5 per cent copper. The flotation process will be used on a minor part of the product.

A spur of the El Paso and Southwestern R.R. furnishes the camp with adequate transportation facilities. This spur leaves the Santa Fe at White Water.

Some of the levels in the mines are down 800 feet.

The Silver City folio, covering this entire region, has been completed by the Geological Survey and will be issued soon.

Wants Logs of Oil Wells

The United States Geological Survey is anxious to secure logs of oil wells and drill holes. A book will be furnished on application in which the record may be kept.

Traffic Developments of the Month

Zinc Complaint Dismissed

In the case of the New Jersey Zinc Co. *vs.* Central Ry. Co. of New Jersey, the Commission dismissed the complaint.

In its decision the Commission said:

"Complainant is a corporation engaged in mining zinc ore, with offices at New York City, N. Y. By complaint, filed December 2, 1914, it challenges the reasonableness of demurrage charges of \$494, assessed at Jersey City, N. J., on forty-eight cars of zinc ore, moved to Jersey City from Franklin Junction, N. J., over an interstate route. Reparation is asked.

"The cars reached Jersey City late in July and early in August, 1914. They were intended for export to Rotterdam and space had been booked for a sailing about August 5. Because of war conditions abroad the vessel expected was never tendered. Despairing of securing means of sending the ore abroad complainant accepted delivery of the cars at Jersey City. On August 12, 1914, they were re-consigned at complainant's request to complainant's plant at Hazzard, Pa.

"The rate originally applied to the movement to Jersey City was the export rate of 95 cents per gross ton. When it was ascertained that the shipments were not to be exported the domestic rate of 7 cents per 100 pounds was substituted. Under defendant's tariffs thirty days' free time was and is allowed for unloading at the port of shipments for export. The free time allowance on re-consigned domestic shipments is 24 hours. The demurrage charges assessed covered detention of the cars for the period between the expiration of twenty-four hours' free time following arrival and August 12.

"Complainant contends that the exportation intended was prevented by conditions for which it was not at all responsible, and that therefore it should be relieved of the payment of the charges involved since they would not have accrued if the ore had been exported. Complainant apparently recognizes that there is no tariff authority for the relief asked and accordingly asks to have defendant's tariffs declared unreasonable for omitting to provide for the situation. Defendant contends that there is no justification for requiring it to bear a burden caused by the European war merely to afford relief to shippers.

"We agree with defendant's contention. It is not our function to condemn a carrier's charges unless they are unlawful, and determinations of illegality require consideration of the rights of carriers as well as of the rights of the shipper. It is well settled that the application of different charges to export traffic and to domestic traffic is justifiable. The shipments involved were subject either to the

tariffs governing export traffic or to the tariffs governing domestic traffic. The ore shipped was not exported, and the reasonableness of the demurrage charges applicable to domestic shipments is not challenged. The complaint accordingly will be dismissed."

Decide David Rutter Case.

In the case of David Rutter & Co. *vs.* Chicago & North Western Ry. Co., in which it was claimed that the defendants have been assessing unlawful, unreasonable, and discriminatory charges on carload shipments of coal from eastern mines to the complainant's yard at Evanston, Ill., the Commission held that—

1. In the absence of joint rates or a specific manner of constructing through rates the lowest combinations via the routes of movement are the lawful rates.

2. The lawful through rates from eastern mines to Evanston were and are the rates to Greenwood Street Station, plus the local distance rate of the Chicago & North Western to Evanston and a reconsigning charge under the conditions named in the tariff, except that where rates to Greenwood Street Station are limited by tariff to shipments unloaded there the combination is made on Chicago instead of on Greenwood Street Station.

3. The allegation of unjust discrimination is not sustained by the record.

4. The traffic here involved is through traffic and the reasonableness of the rates applicable thereto must be considered from the standpoint of the through rates in their entirety. So considered, the evidence does not show that they are unreasonable.

5. Defendants directed to refund all overcharges to complainant, with interest.

The report of the Commission was rendered by Commissioner Clark.

Rules on Mississippi Valley Rates

In the matter of rates on bituminous coal to Mississippi Valley territory, the Commission authorized the carriers to continue rates on coal from mines in Illinois, Kentucky, Tennessee, and Alabama to Memphis, Tenn., Natchez, Miss., Baton Rouge, Bayou Sara, Plantation group, Kenner, and New Orleans, La., and group, Gulfport, Miss., and Mobile, Ala., lower than rates to intermediate points.

Carriers were authorized to continue rates on coal from mines in Illinois and Kentucky to Greenville and Vicksburg, Miss., lower than rates to intermediate points.

Authority to continue rates on coal via indirect routes from mines in Illinois, Kentucky Tennessee and Alabama to junction and com-

mon points in Mississippi Valley territory lower than rates to intermediate points was granted.

Authority to continue rates on coal from mines in Illinois and Kentucky to Bemis, Gibbs, Humboldt, Jackson, McKenzie, Milan, Paris, Union City, Martin, and Rives, Tenn., lower than rates to intermediate points was denied.

Authority to continue rates via direct lines from Alabama mines to Aberdeen, Akerman, Columbus, Ellisville, Enterprise, Hattiesburg, Holly Springs, Jackson, Laurel, Newton, Meridian, Starkville, Vicksburg, and West Point, Miss., and Grand Junction and Middleton, Tenn., lower than rates to intermediate points was denied.

Reasonable maximum rates on bituminous coal from mines in Illinois, Kentucky, and Alabama to Dyersburg, Tenn., Grenada, Oxford, and Kosciusko, Miss., and other points were prescribed.

Chicago Switching Cases Decided.

In the coal switching reparation cases at Chicago, under the title of Thomas W. Gilmore & Co. *vs.* Chicago & North Western Ry. Co., the issue was whether or not complainants have been damaged and are entitled to reparation because of the payment of charges on carload shipments of coal. The Commission held—

1. That complainants in Gilmore & Co. *vs.* Chicago & North Western Ry. Co. and in Hinners Co. *vs.* North Western Ry. Co. have not proven that they were damaged by the payment of charges which were found to be unjustly discriminatory. In a discrimination case the measure of damage is not the difference between the two rates, but is a fact that must be proven with the same definiteness as would warrant a judgment in a court of law.

2. That complainants in Lill & Co. *vs.* C., M. & St. P. Ry. Co. have been damaged and are entitled to reparation to the extent of 10 cents per ton on certain shipments and 5 cents per ton on others because of charges which were found to be unreasonable. No damage was proven on that part of the charges which was found to be unjustly discriminatory.

Anthracite Ruling Postponed

The Commission has postponed until January 1 the effective date of its orders relating to rates, rules and practices governing the transportation of anthracite coal as laid down in its recent anthracite decision. An application for a rehearing of the case was said to be responsible for postponement.

The order was originally set for October 1 and was later postponed until December 1. The first postponement was due to the inability of the carriers to readjust their tariffs before the order became effective, and it was the opinion of the Commission officials that this same difficulty, coupled with the applica-

tion of the Lehigh and Wyoming region shippers of small anthracite for a readjustment of the rates between the two regions and tide-water on barley, buckwheat and rice sizes, was responsible for the additional postponement.

Reparation Allowed

Reparation has been allowed by the commission in the following cases: Electrical Metallurgical Co. *vs.* Kanawha & Michigan Ry. Co.; National Enameling & Stamping Co. *vs.* St. Louis, Iron Mountain & Southern R.R.

Increases Illinois Coal Rates

In the matter of coal from Illinois mines, the Commission following 1915 Western rate advance case, finds the proposed increased rates on bituminous coal from Illinois mines to west bank Mississippi River crossings and other points are justified.

Reparation Allowed

The Commission has granted reparation in the following mining cases: American Zinc Lead & Smelting Co. *vs.* Missouri Pacific; Eagle Smelting & Refining Works *vs.* Pennsylvania Ry.

Oral Argument Cancelled

Oral argument of the case of the American Refining Co. *vs.* the St. Louis and San Francisco R. R., assigned for December 15, has been cancelled.

Hearing Cancelled

The hearing in the case of the Pocahontas Coal Co. Inc., *vs.* the Norfolk & Western, which was assigned for November 15, has been cancelled.

Mica Company Gets Reparation

Reparation has been allowed by the Commission in the case of the Western Mica Mining & Milling Co., *vs.* the Denver & Rio Grande Railway.

Reparation Allowed

Reparation has been allowed by the Commission in the following cases of interest to miners: Bartletsville Zinc Co. *vs.* Atchison Topeka & Santa Fe R. R.; American Smelting & Refining Co. *vs.* Lehigh Valley R. R.

Bureau of Mines Had Good Exhibit

The exhibit of the Bureau of Mines at the Western Pennsylvania Exposition called forth much complimentary comment.

SECRETARY LANE URGES MOBILIZATION OF THE MINERAL RESOURCES OF THE COUNTRY

Banquet Tendered to Van. H. Manning Made Occasion for Important Declarations with Regard to the Mining Industry—George Otis Smith and Senator Walsh Among Speakers

Van H. Manning was the guest of honor at a banquet November 20, tendered to him by the staffs of the Bureau of Mines and of the Geological Survey. The occasion was noteworthy to the mining industry at large in that it called forth important declarations from the Secretary of the Interior, the Director of the Geological Survey, Senator Walsh and the Secretary of the American Mining Congress.

Secretary Lane said in part:

Safety first and America first—these two are one and they are linked together in the Bureau of Mines and what it stands for. Safety for ourselves and safety for our country. The pre-eminence of our country, and what is to stop our country from being pre-eminent when we have the men who can find out the secrets of nature, and having reserved more of this foundation material which goes to make a great industrial people of our or any other nation, because we have passed now into an industrial world and war seems to be the chief industry. At least, it is an industry by itself and today it is being conducted as an expression of the most intense industrial life.

There was a time when a war was just a meeting of a lot of men with swords, and then they sang to the man who made the sword. But the sword plays no part today. Down at the bottom it means immense mineral reserves from development and from most intensive use. Barbed wire, mechanics, chauffeurs, railroads, cannon, high explosives, automobiles, everything that a great industrial nation has constitutes the army now when comes the war, and we are an army pre-eminent great in leading any onslaught, because we have mineral resources greater than those of any other country.

We can build a battleship out of the mines of the United States, and no other country can make that boast. And it is the plan to make the Bureau of Mines a great conservation institution, saving from waste, putting in use; and I have no doubt that the President was wise, as usual, when he selected to direct the work of that Bureau, Mr. Manning.

It has been a matter of very great pride to me to be identified with a department which has in its service men of such large information, ability and self-sacrifice as some of the chemists and engineers we have in the Bureau of Mines. Think of a boy com-

ing out of Swarthmore College some four or five years ago and, when the need of the war came, finding a process by which the ingredients of high explosives could be made out of our petroleum and by which we hope the price of gasoline to every Ford user in the United States will be reduced. I refer to Rittman.

I do not think you gentlemen appreciate the value of radium. There is one of the greatest mysteries of all this world to me. I believe that it is an agent by which inestimable good can be done for the men and women of our country and of all countries, and when we found locked up in Europe the process by which radium could be extracted from carnotite ore, we looked to the Bureau of Mines which produced a Parsons and a Moore who found such a process.

LEADS EDUCATIONAL INSTITUTIONS

Dr. George Otis Smith, director of the Geological Survey, said:

As an institution of higher learning, the United States Geological Survey easily stands first. I realize that this truth is of the type that is sometimes called axiomatic, but for the purpose of making a speech I am going to support my statement and prove the assertion by a few facts. It is not necessary, when I speak of the Geological Survey as an educational institution, for me to refer to the stately halls of learning which we chance to use at the present time as our quarters, nor do I need to point with pride to the illustrious names making up what we might call our faculty, nor do I need to review the long and varied courses making up our curriculum. Our toastmaster, himself a recent graduate, being one of last year's output, has already spoken to you about our production. How easy it is to speak of output and production when you are looking at E. W. Parker. He is referred to as a "corporation geologist" who is now on the outside doing whatever and whomever he can. And still he has not mentioned them all. The list is too long to give here. The fact we will agree upon is that the geology of North America is in safe hands.

Simply to show that the toastmaster has been modest in his statements, he failed to mention John Hays Hammond, who thirty-five years ago began as a humble assistant in the United States Geological Survey. But it

is not these professional geologists who are out after the money that I wish to speak of tonight. I might speak of the geologists who are helping others to know geology. We have them leading the departments of geology in all the great universities from Cambridge to Palo Alto, and there are some institutions in between such as Yale, Chicago, Minnesota, Wisconsin, while at Berkeley, under Secretary Lane, we have adopted a practice of lending the University of California a different geologist every year to serve on their faculty. And we have fitted out in a way these educational institutions with men who are the mainspring of activity. Now at Wisconsin, not being content with having simply a head of the Geological Department, we have in Van Hise a man who was raised to the presidency.

In the matter of State geologists, I have simply to mention Bain, De Wolf, Ashley, and Emmons, and you know what this Federal institution has done in giving the States the best. The class that I wish to speak of this evening, however, is the class of directors, our graduates who have become directors or something like directors. Among the scientific institutions there stands at the head the Smithsonian Institution, with as its secretary, Dr. Walcott, a man who took a long period of training with the Geological Survey; and some of you might next think of the Carnegie Institution, and there again we have a graduate of the Geological Survey in Dr. Woodward. Taking the Carnegie bureaus, of course, Dr. Arthur Day is at the head of the Geophysical Laboratory. Then, when they needed someone to command the Carnegie fleet in foreign waters, they took Peters and made of him an admiral. Also, important here in Washington is the Reclamation Service, and there we have placed two directors, Newell and Davis. Some of you may be surprised when I mentioned the fact that Mr. Graves, chief forester, at the head of the Forest Service, was a Survey field assistant in 1907 in the West, when Director Manning was in Indian Territory, and I was in Utah, all of us on the Survey. I might even go further and speak of the friend of Secretary Lane, Herbert C. Hoover, who has been director for the relief of a whole nation, the nation of Belgium. Mr. Hoover began as a geologic assistant twenty years ago. Coming back nearer home we have another director, our toastmaster this evening, the director of the Anthracite Trust. Then, in my idle moments, as I look out of my windows across to the north side of F Street, I read in letters bright and bold, "The Associated Geological Engineers." Knowing as I do that that office is occupied by Dr. David T. Day, another recent graduate, I suppose he can claim to be two or three directors.

But, of course, the real part of my speech to which I have now given the introduction, refers to Manning, of the class of 1910. Here is a director that is a director. You will see from some of the illustrations on our card

that he was tried in various capacities. He has had more hard knocks than his looks show, but after trying him in all these other places it was decided to make a director of him. That was the last resort. Five years ago when I happened to be at a place called Beverly, I stated what I knew of the record of Mr. Manning. I vouched for all of his career except his politics. President Taft agreed that Manning's sterling Democracy should not offset his other virtues. I think you will see that I am strictly neutral in speaking of his Democracy and his other virtues. He was appointed chief clerk of the Bureau of Mines. Mr. Secretary, when you vouched for him as the proper man to become director of the Bureau of Mines, I cannot really claim for the Geological Survey all that you really said of him, because in addition to his many years of training with the greatest educational institution he had the advantage of five years of excellent training in another institution, one which possibly some day may be as great as the mother institution. So while I regret that I cannot claim credit for the Geological Survey all that Director Manning is, I am glad that the rest of his career is to be credited to the Bureau of Mines. While all of us in the Geological Survey have taken great pride in the career of Topographer Manning, and Chief Clerk Manning, we are now even more proud of Director Manning and to him we pledge our heartiest support.

SPENDS MORE THAN GOVERNMENT

Mr. Callbreath, secretary of the American Mining Congress, closed a hurried description of the campaign which led to the creation of the Bureau of Mines by an urgent appeal for larger appropriations for those bureaus which served the mining industry, calling attention to Senator Walsh's statement concerning the increased saving effected by the Anaconda Copper Co. Mr. Callbreath made the statement that the Anaconda Copper Co. has spent more money in investigation and research work for the benefit of its own business than the Government of the United States has spent during its whole history, looking to the better treatment processes for the saving of mineral values.

"When a private company finds it so profitable to carry on research work for its own benefit, surely the Federal Government, for the benefit of the mining industry as a whole, can afford largely increased expenditures in this behalf."

Samuel Sanford, editor of the *Bureau of Mines*, spoke on "What We Think of Him." His complimentary remarks about Mr. Manning were in the best of taste and very evidently expressed the views of the employees of the Bureau.

E. W. Parker, formerly of the Geological Survey and now with the anthracite coal companies, acted as toastmaster. In introducing Senator Walsh he said:

Man in his present state of development depends for life, labor, and happiness upon a few basic industries. The one springs forth through the earth's surface, the other are the treasures hidden below the surface. Between these, of course, there is a great difference. In agriculture, seed time and harvest follow each other and the products are gathered perennially, but in mining the products once taken from the interior of the earth are never replenished. The products of agriculture are, however, chiefly consumed in their utilization for men. In mining, the products, with the exception of fuels, are due to become part of the permanent wealth of the country. They are not destroyed and their utilization is for the benefit of man. It was not until after the close of the Civil War that the mining industry really began to have any recognition from the Federal Government. It was in 1870 that the first real census of the mining industry was taken. I must drop into statistics every once in a while. In 1881 our mineral products amounted to \$365,000,000. In 1899 the products exceeded one billion dollars for the first time, and in eight years more they exceeded two billion dollars. Two mineral products alone in 1913 exceeded the total of the entire mineral production in the United States in 1888. Everyone now recognizes that the mining industry is of some importance.

Director Manning in concluding his acknowledgment of the honor tendered him said:

"I want your friendship among the material things of life, and to make my administration successful I must retain it. I am grateful to the President of the United States for my appointment as director of the Bureau of Mines; grateful to the Secretary of the Interior, who has assumed great responsibility in my appointment, and grateful to you for the confidence you have expressed in me tonight by assembling here to do me honor."

The remarks of Senator Walsh appear in full in another part of this issue.

The guests were W. W. Adams, G. H. Ashley, Mr. and Mrs. E. J. Ayers, Mr. and Mrs. F. F. Bailey and Mr. and Mrs. O. Bowles, Morris Bien, E. C. Barnard, Frank Bond, Thomas M. Baker, J. H. Brickenstein, Mr. and Mrs. Clifford K. Berryman, Miss Frances B. Burt, Mr. and Mrs. A. H. Brooks, Mr. and Mrs. J. L. Cochrane, J. B. Callahan, Mr. and Mrs. J. F. Callbreath, Mr. and Mrs. F. C. Crass, Mr. and Mrs. M. R. Campbell, Mr. and Mrs. H. F. Clark, Mr. and Mrs. C. B. Dutton, Mr. and Mrs. C. A. Davis, Mr. and Mrs. J. D. Davis, Mr. and Mrs. A. P. Davis, Dr. and Mrs. David T. Day, Mr. and Mrs. George W. Evans, Charles Enzian, J. G. Fairchild, Mr. and Mrs. A. H. Fay, E. B. Fox, Representative and Mrs. M. D. Foster, Claude Galihier, Miss L. S. Gerry, Mr. and Mrs. Lewis Garthe, W. Y. Handy, A. J. Hendley, G. A. Hulet, Princeton, N. J.; R. L. Humphrey, Philadelphia; G. Herbert, Miss Katherine Hitchcock, John C. Hoyt, Mr. and Mrs. Hennen Jennings, first assistant

secretary of the interior and Mrs. A. A. Jones, J. W. Kreuttner, H. L. Kays, S. J. Kubel, Secretary of the Interior and Mrs. Franklin K. Lane, Capt. A. F. Lucas, M. F. Leopold, W. J. Lloyd, D. A. Lyon, Salt Lake City, Utah; H. A. Meyer, Mr. and Mrs. E. B. Meritt, Malcolm McDowell, Miss H. C. McGown, H. D. McCaskey, Mr. and Mrs. R. C. McKinney, J. Middleton, Mr. and Mrs. Henry Munroe, Mrs. Jenny Munroe, Mr. and Mrs. W. C. Mendenhall, S. T. Mather, J. F. Newton, Dr. Charles L. Parsons, Miss Enith Parsons, Miss Anna G. Parsons, Mr. and Mrs. George S. Pope, Mr. and Mrs. W. J. Peters, Mr. and Mrs. E. W. Parker, Sidney Paige, G. S. Rice, Pittsburgh, Pa.; C. T. Robertson, Mr. and Mrs. P. M. Riefkin, Mr. and Mrs. W. A. Ryan, Miss Ryan, Mr. and Mrs. James R. Robinson, Pittsburgh, Pa.; H. C. Rizer, Miss Rizer, Mr. and Mrs. S. Sanford, Dr. S. W. Stratton, Mr. and Mrs. J. W. Swift, Mrs. E. F. Spofford, Ned H. Snyder, Miss Esther I. Susan, Thomas G. Steward, Miss Stevens, Mr. and Mrs. A. C. Spencer, Philip S. Smith, Miss Mai F. Smith, Frank Sutton, Mr. and Mrs. Glenn S. Smith, George O. Smith, Assistant Secretary and Mrs. Bo Sweeney, H. E. Tufft, J. W. Thompson, Mr. and Mrs. W. R. Talbot, Pittsburgh, Pa.; Mr. and Mrs. Clay Tallman, Mr. and Mrs. Clement S. Ucker, T. W. Vaughn, U. B. White, S. G. Wiley, Mr. and Mrs. J. M. Williams, L. R. Wilson, Peter M. Wilson, Mr. and Mrs. David White, Mr. and Mrs. A. M. Walker, Mr. and Mrs. J. M. Whitman, Mr. and Mrs. W. H. Wheeler, and Senator and Mrs. Thomas J. Walsh.

MONTANA POWER COMPANY GETS PRELIMINARY PERMIT

A preliminary permit has been issued by the Geological Survey to the Montana Power Co., which proposes to establish a new power plant on the Madison River. The company already has two plants on this river. The No. 3 plant will develop 20,000 horsepower.

The Montana Power Co. controls 98 per cent of the developed power in Montana. It has under construction and in operation 221,000 horsepower. In all, this company has developed or has in sight 356,000 horsepower. Twenty-five thousand horsepower of this total is consumed in the operation of mines and an additional 18,000 horsepower is utilized at copper smelting plants at Anaconda and Great Falls. Also more than fifty towns are furnished with electricity and 430 miles of the Chicago, Milwaukee & St. Paul R.R. will be electrified.

Developing Manganese Properties

High-grade manganese ores are not produced in great quantities in the United States. Some of the mines in Virginia have a limited output of high-grade ores. Other promising deposits are being developed near Globe, Ariz.

Recent Legal Decisions

In an action for damages by a complainant against an oil company as the owner of lands for the failure of such oil company to deliver to the complainant a lease supported by a fee title to certain oil lands, together with an oil well assumed to be located thereon, wherein the complainant alleged that the defendant land owner represented that it was the owner in fee simple title of the real estate described and that there was located thereon a certain oil well capable of producing fifty barrels per day and representing that there was located adjacent to such land, and which would be available for the complainant's use, a standard drilling rig, boiler and engine in good condition, with a complete outfit of drilling tools and a large footage of casing; and alleging further that he had paid on account of the rental reserved a large sum of money, and that the drilling rig, boiler, engine and drilling tools were not in good condition and that the oil company refused to deliver a lease to 160 acres of proven oil land of which it was vested with a fee simple title, a judgment for \$5,200 damages cannot be sustained where the findings of the court are not definite and do not show the separate items of damages making the sum total, although the findings are definite as to some of the particular items of damages; and the judgment for the return of the money paid as part consideration of the lease cannot be upheld where the action did not proceed upon the theory of rescission, and where there was no offer to rescind or return the consideration and where it is not alleged that the lease which the complainant obtained was without value.

Hullinger vs. Big Sespe Oil Co. (California), 151 Pacific, 369; August, 1915.

Where a mining corporation with the approval of its stockholders leased to another corporation for a term of 999 years all its property, consisting of a manufacturing plant, together with the occupied and unoccupied grounds connected therewith, its mines and quarries, and roads and ways connecting the same, and an amount in acreage of coal lands and other lands connected with its mines and works, not to exceed in the aggregate 10,000 acres, and assigned and transferred to the lessee all its cash, bills receivable, accounts, licenses, leases, contracts, agreements, judgments, mortgages, stocks, and bonds, and where the lessee agreed to pay as rental a sum equal to 4 per cent upon the outstanding capital stock of the lessor, together with a further sum not exceeding \$5,000 to cover the cost of the maintenance of the organization of the

lessor corporation, the rentals, except such cash sum, to be paid direct to the stockholders of the leasing corporation; and where the lessor corporation has maintained its corporate existence merely that it may exist as landlord and lessor, and to this end its stockholders have annually elected a board of directors and other officers and maintained books for the transfer of its capital stock, but has received no income other than as above set forth, and has done nothing else whatsoever in its corporate capacity, and has no quick assets, cash, or bank account, such lessor corporation is not liable for a special excise tax, under the corporation act of August 5, 1909 (36 Stat., 112), assessed against it as a corporation having a capital stock and engaged in business; and where the lessee corporation paid the tax levied under protest and to prevent the leased property from being levied upon and sold at tax sale, it may maintain an action to recover the same.

Cambria Steel Co. vs. McCoach, 225 Federal, 278, p. 279; July, 1915.

Where a mining company leased its mines and mineral lands and sold and assigned its personal property and chooses in action to a lessee corporation and for which the stockholders were to receive a certain annual stated percentage on the amount of stock, and the corporation was to be paid a certain stated sum for the purpose of maintaining its corporate existence as landlord and lessor, and held the remainder of its mineral lands for the purpose of supplying from time to time the lessee lands and mines in lieu of lands and mines described in the lease and which may from time to time be surrendered by the lessee to the lessor, is not doing business within the meaning of the corporation tax act of August 5, 1909 (36 Stat., 112), and is not subject to an excise tax under the statute, as the corporation in such case falls within the distinction that the right of income from outside property or investments of a corporation that is otherwise engaged in business, in which event the investment income may be added to the business income in order to arrive at the measure of the tax; and the right of income from property or investments of a corporation that is not engaged in business, except the business of owning property, maintaining the investments, collecting the income and dividing it among its stockholders, and in the former case the tax is payable, while in the latter it is not.

Cambria Steel Co. vs. McCoach, 225 Federal, 278, p. 282; July, 1915.

TWO COWS PLAY IMPORTANT PART IN THE MINE-RESCUE WORKER'S PHYSICAL TRAINING

The Bureau of Mines attempts to keep up with all those who have been granted certificates for first-aid or mine-rescue work. Among the various requests sent out from time to time is one asking for details of work done to keep in training. One recent reply is as follows:

"Six a. m. arise; clean two cow stalls; clean two cows; feed and water two cows; milk two cows; lead two cows out to pasture and stake them; feed and water seventy chickens; feed and water sixteen ducks: 7.30 a. m., eat breakfast: 8.15 a. m., ride 6 miles to office on motorcycles: 4.15 p. m., ride 6 miles home: 7. p. m., bring in two cows from pasture; feed and water two cows; milk two cows."

It is understood that the Bureau of Mines experts consider that this work is sufficient to keep a holder of one of its certificates in good physical trim.

TUNGSTEN USED PRINCIPALLY IN MAKING OF TOOL STEEL

Tungsten which has been brought into such prominence by the war, finds its great use in the making of ferro-tungsten and metallic tungsten for introduction in tool steels. Smaller uses are for making the filaments of incandescent lamps, contacts, and for Roentgen ray apparatus. The following persons are purchasers of tungsten ores:

Atkins, Kroll & Co., 311 California Street, San Francisco, Cal.

Bethlehem Steel Co., South Bethlehem, Pa.

Chemical Products Co., P. O. Box 1812, Washington, D. C. (J. R. Cain, General Manager).

Crucible Steel Co. of America, Pittsburgh, Pa.

Electro Metallurgical Co., Niagara Falls, N. Y.

Primos Chemical Co., Primos, Pa.

David Taylor & Co., Boston Bldg., Salt Lake City, Utah.

Vanadium-Alloys Steel Co., Latrobe, Pa.

Wegland, Samuel A., 11750 Michigan Ave., Chicago, Ill.

Wolf Tongue Mining Co., Boulder, Colo.

Wood, Henry E., & Co., 1734 Arapahoe Street, Denver, Colo.

York Metal and Alloys Co., York, Pa.

INDIANA'S STATE-WIDE FIRST-AID MEET A SUCCESS

Indiana's State-wide first-aid and mine-rescue meet, which was held recently at Bicknell, was well attended. The high development that has been attained by these crews was demonstrated very clearly. A number of Bureau of Mines men were in attendance and aided in carrying out of the extensive program.

LOUISIANA BULLETIN BEING BROUGHT UP TO DATE

During the past two years the U. S. Geological Survey has made examinations at most of the localities in northern Louisiana where new exploration has been in progress or where oil and gas surface indications, apparently worthy of attention, have been brought to the notice of the Survey.

In many cases, however, the character of the topography and the dearth of exposure of the hard strata have been such as to make impossible the detection of the structure of the concealed strata in advance of a considerable amount of wildcat drilling.

The results of the examinations thus far accomplished or now in progress will probably be prepared for publication within a few months or will be summarized in a general report on the oil and gas fields of Louisiana, which is now in progress. This report will supersede Bulletin 429.

POPULAR INTEREST IN PETROLEUM SHOWS SIGNS OF INCREASING

Due to the number of inquiries which are coming to the American Mining Congress for information in regard to petroleum statistics, it may be stated that the Geological Survey press bulletin No. 226 contains a complete statement of the marketed production and value of petroleum in the United States in 1913 and 1914. The 1913 report covering the production of petroleum in the United States is the latest detailed work available. The report for 1914, however, is in course of publication and will be available very shortly.

Judging from correspondence reaching the Mining Congress there is considerable increase in the amount of popular interest in petroleum.

Compliments Mining Congress Journal

Theo. F. Van Wagenen, a mining engineer of note, who makes his headquarters in Denver, writes as follows in regard to the MINING CONGRESS JOURNAL:

"I find the MINING CONGRESS JOURNAL a very welcome visitor. You are managing to gather a great deal of desirable information for its pages. It is in condensed shape for the busy man. The black head lines make possible easy reference. It suits me to a T. I have little time for long-winded editorials and disquisitions."

Cordon Advance Maps Out

A limited edition of advance copies of the map of the Cordon, Ore., quadrangle has been issued by the United States Geological Survey.

RANSOME SEES PROMISE IN ARIZONA QUICKSILVER

Several encouraging facts are brought out by F. L. Ransome, of the United States Geological Survey, in his report on the quicksilver deposits of the Mazatzal range of Arizona. In part he says:

"Not enough mining work has been done at the time of visit to determine whether the quicksilver deposits of the Sunflower district are susceptible of profitable exploitation. The geologic facts of occurrence and the sampling by Mr. Hutchinson indicate that the parts of the lodes of minable dimensions now exposed to view carry no more than 3 or 4 per cent of quicksilver at the most, although exceptional stringers here or these which might be sorted out from the broken ore are of much higher grade. To obtain a 3 or 4 per cent product—that is, \$60 to \$80 ore at present prices—considerable sorting would have to be done, with rejection of three-fourths or more of the rock broken. The chances for obtaining considerable quantities of 2 per cent or \$40 ore with only moderate sorting appear to be good.

"When it is remembered that the New Idria mine in California, the largest producer of quicksilver in the United States, has for some years been making substantial profits on ore from which 0.5 to 1 per cent of quicksilver is won, it is evident that the Mazatzal deposits have considerable promise. Although costs are probably lower in California than in Arizona, the situation of the New Idria mine is comparable with that of the Arizona deposits in that the mine has a 60-mile wagon haul to the nearest railway. Mr. Hutchinson's sampling, while thoroughly reliable, was only preliminary to possible work and was rendered difficult by the lack of development. Before the deposits can be appraised at their probable value, additional sampling will be necessary. This sampling should be directed particularly to the estimation of the probable available quantity of ore of the minimum grade that can be profitably worked without sorting. To what width, for example, can a lode be mined as a whole to get a 1 to 2 per cent ore and how much of such ore can reasonably be considered available?

"Facts that promise well for future exploitation are the undoubted persistence of the lodes for long distances over the surface and the lack of any evidence of decrease of tenor with increase in depth. Too little has been done to prove that the lodes continue downward without diminution in quicksilver content, and it is generally recognized that quicksilver ores as a rule are not deposited at as great depth as some other ores. Lindgren states that no quicksilver deposit has been worked to a depth of 2,000 feet below its outcrop. On the other hand, the work already done on these deposits gives no foundation for a belief that the cinnabar is less abundant at moderate depth than near the surface.

"The small quantity of quicksilver thus far

produced has been obtained by simply retorting the ore as mined, enough lime being produced from the gangue to effect reduction to the metallic state. It was evident, however, at the time of visit that considerable quicksilver was being lost through the crudity of the operations. More efficient modes of treatment will have to be employed if the deposits are to be worked profitably for any length of time.

"The present transportation facilities are very poor and any plan for profitably working these deposits will have to reckon with the long wagon haul to Phoenix, Mesa or Globe."

CALLS ATTENTION TO FAMOUS ALUMNI OF MISSOURI SCHOOL

It was D. C. Jackling, alumnus of the Missouri School of Mines, who developed the low grade copper industry to where it will contribute about three billion dollars' worth of copper, formerly thrown away, to the world's total output. This amount already is in sight.

It was H. R. Hanley of the Missouri School of Mines who discovered the electrolytic process by which the zinc is removed from complex ore, leaving marketable copper, gold and silver uncomposed.

These are but two of the many alumni of the Missouri school who have added luster to its name. They were spoken of by Dr. A. L. McRae, director of the school, in his recent address before the Kansas City Alumni at the Y. M. C. A.

Through the Jackling organization properties with a known total of 701 million tons of ore have been developed. Only fifteen years ago, he said, this ore was considered without value.

Mr. Hanley, Dr. McRae said, is superintendent of the Bully Hill Copper Mining Co., at Winthrop, Cal. Complex ore was a problem before he developed the electrical treatment. The zinc became composed with the gold and silver, so, when it was sold for the copper, a penalty was exacted from the seller because of the presence of the other ores. By removing the zinc, not only is it saved, but the buyers now pay for the gold and silver present.

Speaking of others who have gone out from the Missouri School of Mines, Dr. McRae mentioned Durward Copeland. He was an instructor in metallurgy in the school and has gone with a South American mining company at a salary of \$1,000 a month and expenses. Emelio Diaz, superintendent of the same company, is a Missouri alumnus.

Must Wait Until Spring

No Government publications will be sent to Alaska during the winter. This is prohibited by the postal regulations. All publications which are issued during the winter, will be forwarded when the regular routes open in the spring.

EXPECT TO RETAIN COAL MARKET IN SOUTH AMERICA

Every effort is being made by the Bureau of Mines to aid the movement on the part of American coal operators to extend their market in South America. It is believed that this is a legitimate market for American coal and that more of the American product should be sold in Latin America than has been the case in previous years. This market has been dominated by England and Australia, largely due to the fact that they granted longer credit than American coal operators were willing to give. The Department of Commerce has worked out plans by which it is hoped that this objection has been overcome.

Since the opening of the war, American export of coal to South America has increased greatly and it is believed by experts here that a large portion of this market will be retained after the close of hostilities in Europe.

Director Manning of the Bureau of Mines is the author of a report on Coal for Export Trade. He has given this matter close study for many years and is taking great personal interest in seeing the extension of American markets to the southern portion of this hemisphere. His report has been translated into Portuguese and Spanish and has been circulated widely in Central and South America.

COMMONWEALTH FINDS GOOD ORE IN HITHERTO BARREN VEIN

The principal feature of interest in the new ore body found in the Commonwealth mine of the Commonwealth Mining & Milling Co. at Pearce, Ariz., was the fact that it occurred immediately above the water level of the district and in the footwall of a large vein, known as the North vein, which hitherto had been unproductive. The length of the ore body, as proved, is a little over 100 feet and its average width, 12 to 14 feet. The average value of the ore body, as mined, was about \$15 per ton, with the value mainly in silver. The ore is typically that of the oxidized ore of this mine in which the greater part of the value is present as the mineral embolite, the chloro-bromite of silver.

Edgar A. Collins is the general superintendent of the property.

STUDY OF COUER D'ALENE ORES POSTPONED INDEFINITELY

Further investigation of the ore deposits of Couer d'Alene cannot be undertaken this year. It probably will be impossible to give them further study next year, unless the Geological Survey is granted a considerable increase in its appropriation.

Due to the curtailing of the Survey's appropriation much necessary geological work has had to be suspended.

JAMES COLE ROBERTS CALLED TO SAFETY PROFESSORSHIP

To fill the Joseph Austin Holmes Professorship of Safety and Efficiency Engineering, the Colorado School of Mines has appointed James Cole Roberts of the United States Bureau of Mines. Mr. Roberts assumed his duties November 1.

It is the consensus of opinion that no man more able than Mr. Roberts could have been found for this position. Mr. Roberts has been with the Bureau of Mines since its foundation and previous to that time was with the Technological Branch of the United States Geological Survey. He has an enviable reputation as a scientist. He has been identified prominently with the safety movement and was associated intimately with Dr. Holmes in his notable efforts in this direction.

UTAH POTASH NOT BASE OF POTASSIUM CHLORATE

Potassium chlorate is usually made from potassium chloride and not from the sulphate, which is the form of the potash product now being made by the Mineral Products Company at Marysvale, Utah.

The chloride which has been used in the manufacture of chlorate in the United States has been imported from Germany. The latter product is manufactured in this country in factories specially designed for such work. It is understood that at Stassfurt, Germany, where the bulk of the German potash salts is produced, major attention is given to the production of the chloride, sulphate and other potash salts directly from the raw material as mined.

Customs drawback has been granted on shrapnel wholly or partially manufactured by the E. W. Bliss Co., of Brooklyn, N. Y., with the use of antimonial lead balls produced wholly by themselves, in whole or in part with the use of imported lead, antimonial lead, and antimony, or with the use of antimonial lead balls or antimonial lead alloy manufactured in whole or in part with the use of the above named imported materials and covered by drawback rates now existing or which may be promulgated in the future.

No Zirconium Metals Produced

So far as is known no zirconium minerals are now being produced in this country. Considerable deposits of zircon exist near Ashland, Va. These are described in a Survey publication. Zirconium oxide (baddeleyite) from Brazil is sold by the Foot Mineral Co., Philadelphia, Pa.

JOHN DAY VALLEY IS INTERESTING GEOLOGICALLY

John Day Valley, in Oregon, has contributed much interesting geological data. It is not the plan of the Geological Survey, however, to make further geological investigations in this valley until topographical mapping has been done and the areal, as well as the stratigraphic geology, has been mapped in detail.

A. J. Collier, a geologist of the Survey, in cooperation with the Oregon Bureau of Mines and Geology, made an examination of a portion of this valley in 1913.

EXPECTS TO SEE SUSTAINED DEMAND FOR MINERALS

An increased demand for American mineral products and manufactures in European and English colonial markets, is certain to be a result of the war, according to the editor of the *Mining Journal* of London. In a letter to the American Mining Congress, the editor of the noted English publication states that he believes there will be greatly increased interest in the tin and rare metal industry, which are more familiar to England, than they have been to the United States.

The *Mining Journal* of London is the oldest mining paper and is the pioneer of the technical and the trade press of the world.

LITTLE PROSPECT FOR MINING COAL IN NORTH CAROLINA

From extensive investigations made by the Geological Survey in North Carolina, the general conclusion is reached that there is little prospect for the coal in that State to be mined on a commercial scale. For the most part, the deposits are thin and irregular and contain a high percentage of ash.

TWO PUBLICATIONS COVER FERTILIZER INDUSTRY

Due to the increased interest in phosphate and fertilizing materials in general, it doubtless will be of interest to many miners to know that at least two publications are issued dealing with fertilizer and fertilizing producing minerals.

The *American Fertilizer* is published at Philadelphia, and the *Commercial Fertilizer* at Atlanta, Ga. Their advertising pages show a list of the owners of phosphate lands.

Compliments Director Smith

The *Public Service Journal*, of Boston, in its current issue, compliments the address of George Otis Smith, the Director of the U. S. Geological Survey, on "Plain Writing."

BISMUTH PRICES MATTER OF INDIVIDUAL BARGAINING

Bismuth is used principally in the making of pharmaceutical preparations and in the making of cliché metals; that is, the alloys which melt at low temperatures, familiarly seen in the automatic sprinklers common in large stores and similar establishments. Bismuth prices seem to be at present a matter of individual bargaining, but are probably \$2.75 to \$3 a pound in large lots. The only known buyer of bismuth ore in this country, not a broker, is the American Smelting and Refining Company. There are numerous brokers who handle the ore, among them E. Schaaf-Regelman, 21 State Street, Battery Park Building, New York City, and David Taylor, Boston Building, Salt Lake City, Utah.

Works on Aluminum

Owing to the increasing interest in the metallurgy of aluminum it is of interest to know that there are two standard works bearing on this subject. They are: "The Production of Aluminum and Its Industrial Use," by Adolph Minet. The book is published by John Wiley & Son, of New York. The other work is: "Aluminum, Its History, Occurrence and Properties," by J. W. Richards. It is published by Baird & Co., of Philadelphia.

BUREAU OF MINES TEACHES PRINCIPLES OF RESCUE WORK

Nearly 9,000 visitors inspected the Bureau of Mines rescue cars and stations during October. Over 5,000 persons attended the lectures given under the auspices of the Bureau of Mines during the same month. During October, 261 persons were given mine rescue training, 1,050 persons were given first aid training, and 186 certificates were issued to persons who had completed training in one or the other of these branches.

Antimony Report Goes to Printer

With the exception of the annual chapters in mineral resources, the United States Geological Survey has no publication on antimony. An extended report has been written, however, and is now ready for the printer. It will be ready for distribution within the next few months.

Zinc Bulletin Coming Out

A bulletin on the origin of lead and zinc deposits of the Joplin region will be ready for distribution within the next month.

SURVEY MAPS ARE NOT ON SALE AT ALL POSTOFFICES

Some misunderstanding seems to have taken place in regard to the sale of maps prepared by the United States Geological Survey by postmasters throughout the country. Whether the postmasters act as agents of the Survey in the sale of maps is entirely a matter of their own volition. It has been stated in some papers that Survey maps will be on sale at all postoffices. This is not the case as it is entirely a matter of choice with the postmaster whether he handles the maps or not.

PREVENTION OF CRACKING IN OPALS UNSOLVED PROBLEM

Several recent discoveries of opal deposits in the West have led to frequent inquiry as to the tendency of opal to crack after being removed from the mine. The opals from the Virginia Valley region of Humboldt County, Nev., has the property of cracking to an unfortunate extent. No definite method of obviating this difficulty has been determined. Some opal miners inclose the gems in clay that the evaporation of the moisture from the stone may take place gradually. In Mexico it is a common practice to put the opal, immediately on removing it from the mine, into glycerine or other oil.

Interest in Analyses

Mineralogists and geologists in the United States and in many foreign countries are showing great interest in Prof. F. W. Clarke's work on Analyses of Rock and Minerals, which was recently published by the Geological Survey.

Kentucky and West Virginia Publications.

The coal fields of Kentucky and West Virginia are covered by the following Geological Survey publications: Bulletins 349, 541-f; geologic folios 47, 69, 77 and 184. In addition part three of the twenty-second annual report of the director of the Geological Survey contains information in regard to these coal fields.

J. E. Hoeing, of Frankfort, Ky., and Dr. I. C. White, of Morgantown, W. Va., the State geologists of their respective States, can furnish much valuable additional data in regard to these coal fields.

Bentonite Production Increases

Bentonite is being mined and marketed in Wyoming in increasing quantity. This mineral is used in making paper, in packing horses' feet and in medical preparations.

HIGH PRICES INDUCE MANY TO MINE ANTIMONY ORES

The Harshaw, Fuller & Goodwin Co., Cleveland, Ohio, is making a series of antimony salts, including oxide for use in enamels. The Chapman Smelting Co., C. Solomon, Jr., president, 409 Battery Street, San Francisco, Cal., and The Merchants' Finance Co., M. Elsasser, manager, 625 Security Building, Los Angeles, Cal., are now smelting antimony ores in this country. Many persons are producing antimony ores at present while the prices are so high.

CALIFORNIA AND OREGON INCREASE PLATINUM OUTPUT

The production of gold ore carrying platinum and palladium in 1914 from the Boss mine of the Yellowpine mining district, Clark County, Nev., added to the domestic production 110.5 ounces of platinum and 168.16 ounces of palladium.

Notwithstanding the lower price received for crude platinum in 1914 than in 1913, the production of both California and Oregon shows an increase over former years. These facts just have been published in a Geological Survey bulletin by J. M. Hill.

The
JANUARY ISSUE
of the
**Mining Congress
Journal**

*will carry the year-
end reports of the
U. S. Geological
Survey on coal and
metal production
for 1915.*

ADVANCE MAPS FURNISHED WHEN NEED IS URGENT

Advance copies of maps being published by the United States Geological Survey are very difficult to obtain. A very limited edition of these advance copies is issued. They are for the use of engineers or others who can show good cause for needing the map urgently. The advanced maps are issued as soon as the office work is completed. These copies are on the field scale, which is one-third larger than the scale of the engraved maps, but the edition is so limited, that no copies ever are available after the map is published.

DR. DOUGLAS GIVES EXHIBIT TO SMITHSONIAN INSTITUTION

Dr. James Douglas has donated to the Smithsonian Institution the Copper Queen mine exhibit, which is now installed with the display of the Bureau of Mines at the Panama Pacific Exposition.

Arrangements are under way which are expected to result in permission to use this exhibit, as well as other Smithsonian matter, at the mining show which will be given by the American Mining Congress in Chicago, late next year.

No Report on Hot Springs Rocks

The U. S. Geological Survey has not issued a report on the igneous rocks in the Hot Springs, Ark., district. Some information is contained in Water Supply Paper 145 as to the Hot Springs district.

The Geological Survey of Arkansas has published a report on the igneous rocks of Arkansas. This can be obtained by writing to Dr. H. F. Drake, State Geologist, Fayetteville.

To Report on Montana Gas

Bulletin 621-F is the only publication of the Geological Survey on oil and gas in Montana. A report on the occurrence of gas at Havre, Mont., will be out in about six months.

Refer to Arizona Counties.

Publications of the United States Geological Survey, with reference to the Mohave and Yuma Counties of Arizona, are: Bulletins 580 and 620-c, 451 and 397.

The annual meeting of the Arizona Chapter of the American Mining Congress will be held at the Chamber of Commerce Building December 6.

A program has been prepared by C. F. Willis, a director of the State Bureau of Mines, and a large and enthusiastic meeting is anticipated.

LACK OF FUNDS HAMPERS HOMESTEAD DESIGNATIONS

Petitions for the designation of land under the enlarged homestead act continue to be received in large numbers by the Geological Survey. During October 1,470 petitions were received. It was only possible to act on 1,000 of them. Petitions which are awaiting action now number 5,800. If the present rate continues, it will be necessary to employ additional men. This can be done only if an increased appropriation is allowed by Congress. It is hoped, however, that this will not be necessary. There are some reasons to think that the number of petitions may decrease later.

Owing to the lack of funds considerable important field work is not being done. This is complicating the situation for the land classification board. This field work in most cases should be done by the water resources branch of the Survey. This branch has not had an increase in appropriation for many years.

GOLD VEINS OF PROMISE FOUND IN PENNSYLVANIA

While Pennsylvania has not produced any gold since 1910, information has reached Washington that gold bearing veins of promise have been found near Bangor, Pa. Pennsylvania in past years has had a spasmodic but very small production of the yellow metal.

EDISON AND FORD DISPLAY INTENSE INTEREST IN "THE MINE"

Among the visitors to "The Mine" at the Panama-Pacific Exposition recently were Thomas A. Edison and Henry Ford. The Bureau of Mines men in charge of "The Mine" stated that no visitor had displayed greater interest in the exhibits than did these two well-known men.

Tungsten Very Scarce

Tungsten users have found great difficulty in getting the ores they need, and prices can only be quoted as very high. It is known that \$35 per unit, or even more, has been paid. A unit is 1 per cent of a short ton in tungsten trioxide.

Tell of Alaskan Tin

Bulletin 622, of the U. S. Geological Survey, is the most recent information on tin in Alaska. Other bulletins covering this subject are numbered 358 and 535.

Coal Report Nearly Ready

The 1914 coal report of the United States Geological Survey will be ready for distribution in a few days.

**POTASH ANNOUNCEMENT
EXCITES WIDE INTEREST**

Due to the recent publication of information from the office of the Secretary of the Interior in regard to the successful production of potash at Marysvale, Utah, a large number of letters are reaching the Geological Survey, asking for more details in connection with the production of potash in the United States. Officials of the Geological Survey are hopeful that within a very few weeks they will have additional information of great interest with regard to the Marysvale deposits.

**CONGRESSMEN ENTITLED TO TWO
COPIES OF FOLIOS AND MAPS**

A misunderstanding seems to exist in many quarters as to the number of folios and maps published by the Geological Survey that may be distributed by Representatives in Congress. Each Representative is entitled to two copies of each folio and map issued during his term of office. The annual quota is about twelve folios and 200 maps.

**FIVE MINE ACCIDENTS
INVESTIGATED IN OCTOBER**

Five mine accidents were investigated by the Bureau of Mines during October.

A fire occurred in the Minshall Mine at Fontanet, Ind. An explosion and fire took place in the Banner Mine, at Banner, Ala. A powder explosion, which resulted in the death of seventeen men, took place in the Granite Mountain Copper Mine, Butte, Mont. One person was killed by smoke from explosives in the new city sewer at Pittsburgh. Gas ignition took place in Peck Shaft, at Peckville, Pa.

**BUREAU OF MINES CREW
DOES GOOD WORK IN INDIANA**

Detail of the work done by the Bureau of Mines rescue crew, at the Minshall mine at Fontanet, Ind., has reached the Bureau and shows that intelligent and courageous work was done. Owing to the large number of openings, the fire was unusually hard to handle, but all obstacles were overcome and the mine was sealed in record time.

**MINT PAYS ONLY FOR GOLD
AND SILVER IN BULLION**

Only the gold and silver contents of bullion is paid for by the Bureau of the Mint. It has been reported recently that the mint would pay for platinum and other metals contained in bullion. This is not the case, however.

**CANADIAN GEOLOGISTS ARE
INFLUENCED BY U. S. SURVEY**

Influence of the work of the United States Geological Survey on the survey of Canada, is evident in Memoir 72 on "Artesian Waters of Montreal" by C. L. Cumming, which was issued recently. This gives a classification of waters based on Dr. Chase Palmer's classification and refers also to the work of T. Sperry Hunt. Mr. Hunt for many years was the leading geochemist of Canada. The work gives a remarkably graphic representation of waters.

**ARIZONA ASBESTOS LOOKS UP
AS PROPERTIES ARE DEVELOPED**

Continuing development of Arizona asbestos deposits brings out the fact more clearly that the deposits are extensive and that the product is of very fine quality. The only drawback to the more rapid development of these mines is the fact that they are situated at a considerable distance from the railroad.

Does Not Loan Instruments

Almost daily requests are received by the United States Geological Survey asking for the loan of instruments. There is a long-established policy of the Survey not to loan its instruments.

Arlington Map Ready in March

The Arlington quadrangle which lies in Oregon and Washington has been mapped and copies of the engraved map will be available for distribution in March.

Manning Chosen

Van H. Manning, Director of the United States Bureau of Mines, has been made a member of the Illinois Commission for mine rescue and fire prevention.

Geochemical Work in Type

The third edition of *Data of Geochemistry* is now in type and will be issued in about three months as U. S. Geological Survey Bulletin 616. It is the work of Prof. F. W. Clarke.

New Mexico Society Recognized.

Formal recognition has been granted by the United States Geological Survey to the newly organized State Geographical Society of New Mexico.

PERSONALS

Fred McLaughlin, topographical engineer of the United States Geological Survey, together with C. W. Arnold and E. R. Ireland, W. H. S. Morey, and F. W. Farnsworth, of the topographical branch of the Survey, have returned to Washington after a season in the field.

S. G. Lunde, who has been making a profile survey of the Skagit district of Washington, has returned to Washington.

W. R. Calvott, chief clerk of the Pittsburgh office of Bureau of Mines, was in Washington last month conferring with Director Manning.

Fred Graff, Jr., who has been making topographic surveys in Oregon, has returned to Washington.

Charles P. Lupton has returned to Washington after having spent the summer in field investigation in the Big Horn Basin of Wyoming.

C. G. Anderson, topographic engineer, whose field assignment during the past season consisted of making a plan and profile survey of the Snake River between St. Anthony and Henry Lake, Idaho, as well as mapping the southeast quarter of the Ammon quadrangle, has returned to Washington for the winter.

Hersey Munroe, a topographic engineer who is well known throughout the United States, has finished some important work for the Survey in Vermont, where he has completed work on the Robinson quadrangle.

Has Issued Fifty-three Kentucky Maps

Fifty-three topographical maps of Kentucky areas have been issued by the United States Geological Survey.

There can be no recovery in an action for the death of a person or employe in a mine employed in the capacity of assistant boss driver who gratuitously, or without proper authorization, undertook to aid in the work of repairing a wreck in the mine, and in so doing handled an electric wire which shocked and killed him.

Republic Iron & Steel Co. vs. Quinton (Alabama), 69 Southern, 604, p. 605; July, 1915.

NAVY DEPARTMENT RECOGNIZES VALUE OF OIL AS A FUEL

The keel of the first battleship ever designed to be propelled solely by oil fuel and electric power was laid recently—the dreadnaught *California*, with 32,000 tons displacement, 21 knots speed and twelve 14-inch guns. The electric drive and oil fuel will give the *California* a cruising radius twice as great as that of the new dreadnaught *Wyoming*.

Some of the finest warships now afloat consume oil exclusively for fuel. Among them is the *Queen Elizabeth*, whose 13-inch guns have been heard at the Dardanelles. But no foreign vessel is yet driven by electric power, and in this respect the United States Navy takes the lead.

Secretary Daniels, speaking at Brooklyn while the keel of the *California* was being laid, predicted that the Navy eventually would own its oil lands and produce, transport, refine and store its own oil supply. Steps have been taken already by setting apart oil-bearing public lands for naval use. The plans in this direction should be worked out and executed without delay, now that the superiority of oil over coal has been demonstrated, says the *Washington Post*. Storage stations should be established at every strategic point under the American flag from Eastport to Olongapo, and stations should be acquired under foreign flags at advantageous points, particularly in the Caribbean. Other nations are looking after their oil supplies, either directly or through corporations. The promising oil fields of Mexico, Colombia and Venezuela should not be permitted to pass to foreign control through the lack of enterprise of this Government and its citizens. Oil is a naval and military agent of the highest importance.

Fair Increases Gem Sales

The total value of the output of precious and semi-precious stones in the United States in 1914 is reported by D. B. Sterrett, of the United States Geological Survey, at \$124,651. The demand for gems at the Panama-Pacific Exposition resulted in an increased production of turquoise and turquoise matrix, the production in 1914 being \$13,370, as compared with \$8,075 in 1913. These gems have long been popular in the tourist trade in the West.

No discoveries of unusually fine deposits of gem minerals were made in 1914, but a few prospects for the less valuable gems were found. Among these were pink beryl in the quarry of the Maine Feldspar Co., on Mount Apatite, near Auburn, Me.; amazon stone, a variety of feldspar, near Lone Pine, Cal.; White Plains, N. Y., and on the coast of Maine; sunstone in the Apache Indian Reservation of Arizona; and turquoise deposits in Lander and Eureka Counties, Nevada.

Philadelphia New York Boston Pittsburgh Buffalo Altoona Mauch Chunk

WHITNEY & KEMMERER

SHIPPERS OF THE FOLLOWING COALS:

LEHIGH

Pardee Bros. & Co.'s

LATTIMER

Harwood Coal Co.'s

HARWOOD

SANDY RUN

Buck Mountain Vein

FREE-BURNING

Alden, Wyoming,

Oak Hill,

Mt. Jessup,

Corbin,

Wilkes-Barre,

Moosic Mountain

LEHIGH & WILKES-BARRE COAL CO.'S

HONEY BROOK

WILKES-BARRE

PLYMOUTH

Also

PHILADELPHIA &

READING COAL &

IRON CO.'S

VARIOUS COALS

Shippers of Following Bituminous:

GRASSY RUN (Big Vein)

LILLY VALLEY (Smithing)

RICH HILL (Cambria Co.)

GEORGES CREEK

FEDERAL (Smokeless)

BULAH

ALSO GAS COAL AND COKE

Shipments to All Points via Either Tidewater or All-Rail

143 LIBERTY STREET

NEW YORK

STEPHEN GIRARD BUILDING

PHILADELPHIA, PA.

SUSQUEHANNA COAL CO.

MINERS AND SHIPPERS

SUPERIOR ANTHRACITE

GENERAL OFFICE:

907 COMMERCIAL TRUST BUILDING

PHILADELPHIA, PA.

Sales Offices:

NEW YORK	-	-	-	-	-	-	-	-	-	No. 1 Broadway
PHILADELPHIA	-	-	-	-	-	-	-	-	-	1436 Commercial Trust Bldg.
CHICAGO	-	-	-	-	-	-	-	-	-	1305 Old Colony Bldg.
ERIE, PA.	-	-	-	-	-	-	-	-	-	210 Marine Bank Bldg.
BALTIMORE	-	-	-	-	-	-	-	-	-	100 Chamber of Commerce Bldg.
WILLIAMSPORT, PA.	-	-	-	-	-	-	-	-	-	1, 2 & 3 Hart Building

AMERICAN MINING CONGRESS

OFFICERS AND COMMITTEES, 1915

OFFICERS

CARL SCHOLZ, President
HARRY L. DAY, First Vice President
M. S. KEMMERER, Second Vice President
JAMES E. TALMAGE, Third Vice President
J. F. CALLBREATH, Secretary
E. L. WOLCOTT, Assistant Secretary

EXECUTIVE COMMITTEE

CARL SCHOLZ CHARLES M. MODERWELL
WALTER DOUGLAS

DIRECTORS

M. S. KEMMERER, New York
E. A. MONTGOMERY, Los Angeles, Calif.
WM. B. PHILIPS, Golden, Colo.
W. J. RICHARDS, Pottsville, Pa.
JAMES E. TALMAGE, Salt Lake City, Utah
CHARLES M. MODERWELL, Chicago, Ill.
SAMUEL A. TAYLOR, Pittsburgh, Pa.
L. A. FRIEDMAN, Lovelock, Nevada
CARL SCHOLZ, Chicago, Ill.
HARRY L. DAY, Wallace, Idaho
CHARLES S. KEITH, Kansas City, Mo.
WALTER DOUGLAS, Bisbee, Arizona

COMMITTEES 1915

STATE VICE-PRESIDENTS

Alaska.....	B. P. Millard.....	Valdes
Arizona.....	W. B. Twitchell.....	Phoenix
Arkansas.....	C. C. Woodson.....	Huntington
California.....	Charles E. Knox.....	Berkeley
Colorado.....	Irving Howbert.....	Colorado Springs
Georgia.....	W. H. Fluker.....	Thomson
Idaho.....	James F. McCarthy.....	Wallace
Indiana.....	J. C. Kolsen.....	Terre Haute
Illinois.....	F. W. DeWolf.....	Urbana
Kansas.....	Joseph Fletcher.....	Frontenac
Michigan.....	J. A. Curtis.....	Detroit
Maryland.....	J. M. Fitzgerald.....	Baltimore
Missouri.....	W. B. Shackelford.....	Webb City
Minnesota.....	F. O. Hammer.....	St. Paul
Montana.....	Frank R. Wicks.....	Butte
Nebraska.....	Frank A. Manley.....	Omaha
New York.....	Charles H. Smith.....	New York
Nevada.....	C. B. Lakenan.....	McGill
New Mexico.....	T. H. O'Brien.....	Dawson
Ohio.....	W. R. Woodford.....	Cleveland
Oregon.....	Harold N. Lawrie.....	Portland
Pennsylvania.....	Morris Williams.....	Philadelphia
South Carolina.....	H. L. Scaife.....	Clinton
Texas.....	Dr. W. B. Phillips.....	Austin
Utah.....	Dr. J. E. Talmage.....	Salt Lake City
Virginia.....	E. A. Schubert.....	Roanoke
Wisconsin.....	H. O. Granberg.....	Oshkosh
Wyoming.....	W. D. Brennan.....	Cheyenne
West Virginia.....	Ernest Chilson.....	Rush Run
Washington.....	Col. W. T. Perkins.....	Seattle

REVISION OF MINERAL LAND LAWS

E. B. KIRBY, St. Louis, Mo., *Chairman*
L. V. Ray.....Seward, Alaska
Will L. Clark.....Jerome, Arizona
E. H. Benjamin.....San Francisco, California
Victor C. Alderson.....Denver, Colorado
J. H. Richards.....Boise, Idaho
Wm. Scallan.....Helena, Montana
Horace V. Winchell.....Minneapolis, Minnesota
E. B. Kirby.....St. Louis, Missouri
D. C. McDonald.....Ely, Nevada
C. T. Brown.....Socorro, New Mexico
H. H. Schwartz.....Portland, Oregon
Isadore Broman.....Austin, Texas
W. H. King.....Salt Lake, Utah
L. K. Armstrong.....Spokane, Washington
Edwin Hall.....Lusk, Wyoming

ALASKAN AFFAIRS

Falcon Joslin.....Fairbanks, Alaska
George C. Hazlett.....Cordova, Alaska
M. D. Lehey.....Seattle, Washington
William Griffith.....Scranton, Pennsylvania
T. P. McDonald.....Seattle, Washington

WORKMEN'S COMPENSATION

J. W. Dawson.....Charleston, West Virginia
W. R. Woodford.....Cleveland, Ohio
David Ross.....Springfield, Illinois
T. L. Lewis.....Bridgeport, Ohio
J. C. Kolsen.....Terre Haute, Indiana

UNIFORM MINE REPORTS

Samuel A. Taylor, Pittsburgh, *Chairman*
E. T. Bent.....Chicago, Ill.
J. C. McKinley.....Wheeling, W. Va.

CONFERENCE WITH FEDERAL TRADE COMMISSION

Charles M. Moderwell.....Chicago, *Chairman*
Hugh Shirkie.....Terre Haute
M. S. Kemmerer.....New York
Harry N. Taylor.....Kansas City
F. S. Landstreet.....New York

PREVENTION OF MINE ACCIDENTS

W. R. INGALLS, New York City, *Chairman*
Dr. James Douglas.....New York City, New York
J. P. Channing.....New York City, New York
J. R. Finley.....New York City, New York
John Hays Hammond.....New York City, New York

STANDARDIZATION OF ELECTRICAL EQUIPMENT

In Coal Mines

GEO. R. WOOD, Philadelphia, Pa., *Chairman*
S. A. Taylor.....Pittsburgh, Pennsylvania
J. R. Bent.....Oglesby, Illinois
G. T. Watson.....Fairmont, West Virginia
H. M. Warren.....Scranton, Pennsylvania
G. A. Schreier.....Divernon, Illinois
W. A. Thomas.....Pittsburgh, Pennsylvania

In Metal Mines

H. S. SANDS, Denver, Colo., *Chairman*
C. A. Chase.....Denver, Colorado
Sanford B. Belden.....Columbus, Ohio

FORESTRY RELATIONS

ROBERT L. MARTIN, Denver, Colo., *Chairman*
F. J. Alexander.....Denver, Colorado
J. W. Deane.....Aspen, Colorado
Henry I. Seeman.....Denver, Colorado
Carney Hartley.....Denver, Colorado

MINE TAXATION

In Metal Mines

D. L. Webb.....Denver, Colorado
Prof. L. A. Young.....Urbana, Illinois
Prof. H. A. E. Chandler.....Phoenix, Arizona
John Wellington Finch.....Denver, Colorado
D. W. Brunton.....Denver, Colorado

MINING INVESTMENTS

W. R. ALLEN, Butte, Mont. *Chairman*
R. F. Collins.....Spokane, Washington
John R. Burton.....New York City, New York
J. F. Erisman.....Denver, Colorado
Charles A. Mitke.....Bisbee, Arizona

BUREAU OF MINING ECONOMICS

S. D. Warriner.....Philadelphia, Pennsylvania
F. S. Peabody.....Chicago, Illinois
B. F. Bush.....St. Louis, Missouri
D. W. Brunton.....Denver, Colorado

FREIGHT AND ORE TREATMENT RATES

Imer Pett.....Salt Lake City, Utah
Harry Joseph.....Salt Lake City, Utah
Geo. H. Derr.....Salt Lake City, Utah
W. Mont Ferry.....Salt Lake City, Utah
Arthur Thomas.....Salt Lake City, Utah

COMMITTEES ON STATE LEGISLATION

ALASKA

Col B. F. Millard, *Chairman*..... Valdez, Alaska
Charles A. Sulzer..... Sulzer, Alaska
W. T. Burns..... Fairbanks, Alaska

ARIZONA

William B. Twitchell, *Chairman*..... Tucson, Ariz.
William McDermott..... Tucson, Ariz.
F. M. Murphy..... Prescott, Ariz.

ARKANSAS

C. C. Woodson, *Chairman*..... Huntington, Ark.
W. T. Satterfield..... Little Rock, Ark.
M. M. McWilliams..... Spadra, Ark.

CALIFORNIA

Charles E. Knox, *Chairman*..... Berkeley, Cal.
Walter H. Wiley..... Los Angeles, Cal.
Thos. T. Read..... San Francisco, Cal.

COLORADO

Victor C. Alderson..... Denver, *Chairman*
Edward Arps..... Ouray
John T. Joyce..... Silverton

IDAHO

James F. McCarthy, *Chairman*, Hecla Mining Co..... Wallace, Idaho
Jerome J. Day..... Moscow, Idaho
Ravenal Macbeth..... Mackey, Idaho

KANSAS

Jos. Fletcher, *Chairman*..... Frontenac, Kans.
Francis Keegan..... Pittsburg, Kans.
Ira Clemens..... Pittsburg, Kans.

NEBRASKA

Frank A. Manley, *Chairman*..... Omaha, Nebr.

NEW YORK

C. H. Smith, *Chairman*, 55 Liberty Street..... New York City, N. Y.

NEW MEXICO

T. H. O'Brien, *Chairman*..... Dawson, N. Mex.
R. H. Beddow..... Gallup, N. Mex.
John Sully..... Santa Rita, N. Mex.

OREGON

H. N. Lawrie, *Chairman*, 506 Yeon Building..... Portland, Oreg.
A. M. Swartley..... Corvallis, Oreg.
H. M. Parks..... Corvallis, Oreg.

OKLAHOMA

James Elliott, *Chairman*..... McAlester, Okla.
Dorset Carter..... Oklahoma City, Okla.
F. B. Drew..... McAlester, Okla.

SOUTH CAROLINA

H. L. Scaife, *Chairman*..... Clinton, S. C.

VIRGINIA

E. A. Schubert, *Chairman*..... Roanoke, Va.
M. M. Caldwell..... Roanoke, Va.
J. N. Harmon..... Tazewell, Va.
Percival Johnson..... Pulaski, Va.

WISCONSIN

H. O. Granberg, *Chairman*..... Oshkosh, Wis.

WYOMING

W. D. Brennan, *Chairman*..... Cheyenne, Wyo.
P. J. Quealy..... Kemmerer, Wyo.
H. S. Hopka..... Deitz, Wyo.

WASHINGTON

W. T. Perkins, *Chairman*..... Seattle, Wash.

COMMITTEES ON FEDERAL LEGISLATION

ALABAMA

Dr. Eugene A. Smith, *Chairman*..... University, Ala.
W. P. G. Harding, 1855 Wyoming Avenue, NW..... Washington, D. C.
John W. Abercrombie..... Tuscaloosa, Ala.

ARIZONA

Charles F. Willis, *Chairman*, Director, Bureau of Mines..... Tucson, Ariz.
Frank W. Deane..... Douglas, Ariz.
Courtenay DeKalb..... Tucson, Ariz.

ARKANSAS

N. F. Drake, *Chairman*..... Fayetteville, Ark.

COLORADO

R. D. George, *Chairman*..... Boulder, Colo.
Fred Carroll..... Denver, Colo.
Bulkeley Wells..... Telluride, Colo.

GEORGIA

S. W. McCallie, *Chairman*..... Atlanta, Ga.
N. P. Pratt..... Atlanta, Ga.
B. M. Hall..... Atlanta, Ga.

ILLINOIS

F. W. DeWolf..... Urbana, Ill.

INDIANA

Edward Barrett, *Chairman*..... Indianapolis, Ind.
Frank I. Pearce..... Indianapolis, Ind.
John C. Wright..... Boonville, Ind.

IOWA

Geo. F. Kay, *Chairman*..... Iowa City, Iowa
Edward Sweeney..... Des Moines, Iowa
Prof. L. C. Hodson, State College..... Ames, Iowa

KANSAS

Erasmus Haworth, *Chairman*..... Lawrence, Kans.

KENTUCKY

J. B. Hoeing, *Chairman*..... Frankfort, Ky.
A. G. Spillman..... Earlinton, Ky.
Perry Gorman..... Hazard, Ky.

MAINE

Prof. C. Vey Holman, *Chairman*, Holman Oaks..... Rockland, Me.

MARYLAND

Wm. B. Clark, *Chairman*, Johns Hopkins University..... Baltimore, Md.
H. V. Hesse..... Frostburg, Md.
E. B. Mathews, Johns Hopkins University..... Baltimore, Md.

MICHIGAN

R. C. Allen, *Chairman*..... Lansing, Mich.

MINNESOTA

Dr. W. H. Emmons, *Chairman*..... Minneapolis, Minn.
Rukard Hurd..... St. Paul, Minn.
W. R. Appleby..... Minneapolis, Minn.

MISSISSIPPI

E. N. Lowe, *Chairman*..... Jackson Miss.
W. L. Kennon..... University, Miss.
Louis Roark..... Agricultural College, Miss.

MISSOURI

H. A. Buehler, *Chairman*..... Rolla, Mo.

NEBRASKA

E. H. Barbour, *Chairman*..... Lincoln, Nebr.
Robt. W. Ellis..... Lincoln, Nebr.
E. F. Schramm..... Lincoln, Nebr.

NEW MEXICO

Chas. T. Kirk, *Chairman*..... Albuquerque, N. M.
Ress H. Beddow..... Gallup, N. Mex.
J. Van Houten..... Raton, N. Mex.

NORTH CAROLINA

Jos. Hyde Pratt, *Chairman*..... Chapel Hill, N. C.
Frank Hewitt..... Asheville, N. C.
Thos. F. Woodruffe..... Mount Airy, N. C.

NORTH DAKOTA

A. G. Leonard, *Chairman*..... University, N. D.
J. W. Bliss..... Bismarck, N. D.
E. J. Babcock..... University, N. D.

OHIO

J. A. Bownocker, *Chairman*..... Columbus, Ohio

PENNSYLVANIA

Richard R. Rice, *Chairman*..... Beaver, Pa.
R. A. F. Penrose, Jr., Bullitt Building..... Philadelphia, Pa.
Elmer E. Hiles, Oliver Building..... Pittsburgh, Pa.

SOUTH DAKOTA

Ellwood C. Perisho, *Chairman*..... Brookings, S. Dak.

TENNESSEE

A. H. Pardue, *Chairman*..... Nashville, Tenn.
John W. Fry..... Columbia, Tenn.
W. F. Albright..... Nashville, Tenn.

TEXAS

Wm. B. Phillips, *Chairman*..... Austin, Tex.

VIRGINIA

Thomas L. Watson, *Chairman*..... Charlottesville, Va.

WEST VIRGINIA

I. C. White, *Chairman*..... Morgantown, W. Va.
J. C. McKinley..... Wheeling, W. Va.
J. W. Dawson..... Charleston, W. Va.

WYOMING

L. W. Trumbull, *Chairman*..... Cheyenne, Wyo.
O. M. Beck..... Atlantic City, Wyo.
P. J. Quealy..... Kemmerer, Wyo.

*If it happens in
Washington*

*If it is of interest to
the Mining Industry*

IT IS IN THE

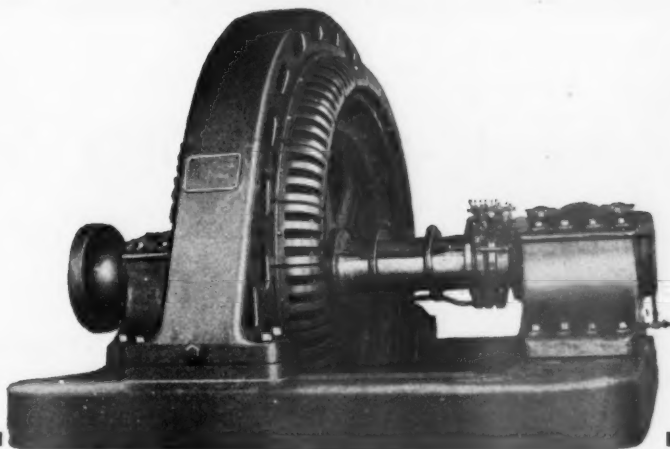
Mining Congress Journal

*The Mining Congress Journal
covers:*

Congress	The Geological Survey
The Bureau of Mines	The Supreme Court
The Patent Office	The Interstate Commerce Commission
The Land Office	

and other bureaus and courts

They all develop news of important interest to
mine operators



Over twice as large as any A. C. hoist motor in America

An 1800 h. p. G-E alternating current hoist motor and control equipment has been ordered by the Tennessee Coal, Iron and Railroad Co. for the following duty:

Hoist unbalanced.	
Length of haul (maximum).....	5280 ft.
Angle between shaft and horizontal (average) approx.	40 per cent.
Weight of skip or cage.....	13440 lbs.
Weight of ore per trip.....	26880 lbs.
Size of rope.....	1 3/4 lbs.
Diameter of drum.....	12 ft.
Average rope speed in feet per minute.....	2700 R.P.M.
Time for acceleration.....	15 sec.
Time for constant running (5280 ft. level).....	106 sec.
Time for retardation.....	8 sec.
Rest for period (loading).....	30 sec.
Number of tons (long) per hour (max.).....	150
Number of tons (long) per hour (average).....	100

*Complete bulletins describing mine hoist equipment
will be sent on request*

General Electric Company

General Office: Schenectady, N. Y.

District Offices in:

Boston, Mass.
Cincinnati, Ohio

New York, N. Y.
Chicago, Ill.

Philadelphia, Pa.
Denver, Colo.

St. Louis, Mo.

Atlanta, Ga.
San Francisco, Cal.

Sales Offices in all Large Cities

5727



DICKSON & EDDY

17 BATTERY PLACE
NEW YORK

Shippers of Celebrated

Scranton Coal Company's Hudson Coal Company's

COALS

WM. C. BLODGETT, Western Agent
BUFFALO, N. Y.

AGENCIES

GLOBE COAL CO., Chicago, Ill.
A. S. AUSTIN, Milwaukee, Wis.



Thorne, Neale & Company

Incorporated

601-610 Stephen Girard Building, Philadelphia, Penna.

Temple Collieries—
Harry E., L. V.; Forty
Fort, L. V.; Mount
Lookout, L. V. or D.,
L. & W.; Lackawanna,
D., L. & W. or Erie.

Schuylkill Collieries—
Buck Run, P. & R.;
New Castle, P. R. R.

ANTHRACITE

AND

BITUMINOUS

COALS

Agents for
Pardee Bros. & Co.
Lattimer-Lehigh

Bituminous—Sonman
Shaft, "B" Vein; Son-
man Slope, "E" Vein.

Sonman Smithing—1½-inch Screened, Low Sulphur, Spongy Coke

SHIPMENTS—RAIL OR WATER

CHAS. E. FERNBERG, *General Sales Agent*
New York Office: 17 Battery Place

Baltimore

Boston

Chicago

Buffalo

Mauch Chunk

Cable Address: "THORNEALE"

Goodman Electric Locomotives

Are made in many types and sizes,
to suit exactly the requirements of
all mining work, from the

Lightest of Gathering
to the
Heaviest of Hauling

Single-Motor and Two-Motor
Types, in Various Styles,
Variously Equipped

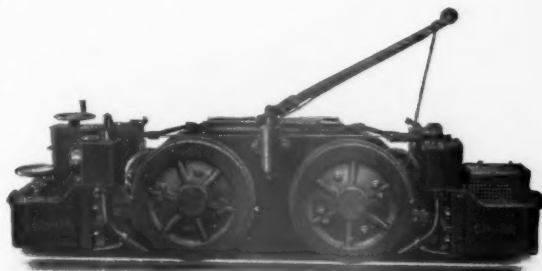
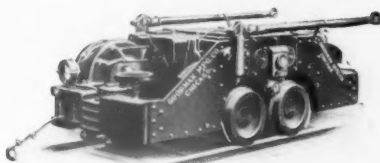
The Rack Rail System for
Hilly Mines

Gatherers for All Sorts of
"Mule" Service

Write for our Series "M" Bulletins

GOODMAN MFG. CO.
Chicago, Ill.

Pittsburgh	Charleston, W. Va.	
Cincinnati	New York	Birmingham
St. Louis	Denver	Seattle



(45)

What Is Saved Is an Asset **What Is Lost Is a Liability**

Saving the maximum amount of values
from ore increases profits.

Easy profits accrue as a result of judicious
investments.

An air Concentrator represents an invest-
ment which returns large dividends.

It conserves ore.

It reduces waste to the minimum.

It does away with the use of water for
concentrating purposes.

It is economical to operate.

We assay for all minerals.

Write today for full particulars.

The NATIONAL
Manufacturing &
Constructing Co.

Orrville :: :: Ohio



Tandem Unit of Jeffrey 6-Ton Electric Locomotives coupled together and operated by One System of Control.

Heavy Haulage Equipment For Narrow Gauge Work

Jeffrey Electric Locomotives

Solved the Problem Satisfactorily for the
Arizona Copper Company



30 H. P. Motor mounted on wheels and axles

This method of mounting gives larger motor capacity, makes motor more accessible for inspection and repairs, and is advantageous where the locomotive must travel through water over the track.

The locomotives are of the double motor type, made up in six-ton units, two of them being of the tandem type, and three of separate 6-ton units. All the units are equipped with "straight" air brake systems, steel tires and M. H. 117 motors.

In addition to these, the company has in operation three Jeffrey 12-ton tandem locomotives and four 6-ton single units equipped with lighter motors.

Send for Special Bulletin 111-58 fully describing this installation]

JEFFREY MFG. COMPANY

958 North Fourth Street, COLUMBUS, O.

New York
Boston

Philadelphia
Pittsburgh
Denver

Chicago
Birmingham
Charleston, W. Va.

Milwaukee
Montreal

12-15

